Liebert®
Keeping Business in Business®

MONITORING

OPENCOMMS™ NFORM

USER MANUAL

Version 1.1
Release

EMERSON.
Network Power

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OPENCOMMS™ NFORM

Version 1.1 Release
User Manual

Liebert® Corporation

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SL-29000 (October 13, 2003)

1.0 WHAT IS NFORM?

Liebert developed Nform to use Simple Network Management Protocol (SNMP) to monitor and manage a wide variety of networked equipment, protecting it from costly damage resulting from power failures and mechanical breakdowns. The monitored equipment can include industrial air conditioning units, Uninterruptible Power Supply (UPS) units and other devices that accommodate an SNMP card to communicate over an Ethernet network. Nform will monitor and manage devices manufactured by Liebert or by other equipment makers.

Nform constantly monitors configured equipment, warns of problems ranging from power quality to environmental conditions.

This product also permits configurable responses to equipment alarms, including support for audible alarms, e-mail and on-screen notification.

1.1 How Does Nform Work?

Nform on a host computer communicates with up to 30 devices, by default, using SNMP to detect problems ranging from power quality to environmental conditions.

The user has the option of expanding Nform's network capabilities with additional licenses. Licenses are available in increments of 30 or 500 additional monitored and managed devices.

Nform employs the SNMP protocol and static IP addresses to issue notifications and warnings, launch scripts and send e-mail messages. It uses HTML to graphically display system information for devices with an SNMP card that is Web-enabled. Nform performs its monitoring and management processes using the network—instead of requiring separate, expensive hardware and cables that might run alongside network lines.

Typical sequence

- Nform constantly monitors multiple SNMP devices made by Liebert or other manufacturers.
- In the event any alarm occurs, Nform receives an SNMP trap.
- According to configuration, Nform issues a local notification to the monitoring computer, executes any associated actions—sending e-mails, writing alarm data in files and launching scripts—and logs alarm data.
- Users can later acknowledge and delete any alarms from Nform's Net Event Manager.

2.0 HOW DO YOU CONTACT LIEBERT FOR TECHNICAL SUPPORT?

For help on deciding how to set up Nform or any other Liebert monitoring product, contact Liebert's Software Technical Applications Support Center at:

UNITED STATES	Phone: 1 800 222 5877
FRANCE	Phone: +33 1 43600177
GERMANY	Phone: +49 89 9050070
ITALY	Phone: +39 049 9719111
NETHERLANDS	Phone: +31 33 2474074
UNITED KINGDOM	Phone: +44 1628403200
WORLDWIDE	Phone: 1 614 841 6755
	FAX: 1 614 841 5471
	All Products: **http://www.liebert.com** Nform: **http://nform.liebert.com**
	E-mail: **monitoring@liebert.com**

3.0 WHO CAN BENEFIT FROM NFORM?

Any industry operating devices utilizing the SNMP protocol can benefit from using Nform to protect valuable equipment, data and other assets in the event of power or mechanical failure.

Nform's protection can be extended beyond equipment manufactured by Liebert to encompass other makers' SNMP devices. Nform ships with templates—specifications and functionality—for Liebert-built SNMP devices. Liebert offers templates for other manufacturers' equipment; contact your local Liebert representative, value-added reseller, or distributor for information.

3.1 Connections

Nform works with a network connection and either of these types of SNMP cards:

1. SNMP card with Web capability such as the OpenComms NIC, OpenComms™ Web Card
2. SNMP card without Web capability, such as the Intellislot™ SNMP card

Nform can monitor a network that includes any combination of LANs, WANs and any other type of network.

4.0 WHAT IS REQUIRED TO USE NFORM?

Visit the Liebert Web site at **http://nform.liebert.com** for the latest product information. The Web site always has the most detailed and up-to-date information on system requirements and Nform's capabilities.

4.1 Connecting host computer and SNMP devices

SNMP communications allow you to take full advantage of Nform's features. The host computer connects to an SNMP-enabled device over a network. Information and management commands may be passed over the Internet, a Local Area Network (LAN) or a Wide Area Network (WAN) via SNMP protocol and static IP addresses.

4.2 Requirements for Installing Nform

Before beginning installation, review these requirements:

The prospective user must have:

- The Nform software (Visit the Liebert Web site at **http://nform.liebert.com** or contact your local Liebert representative, value-added reseller, or distributor for information.)
- This manual (downloadable from the Liebert Web site)
- A computer with Microsoft® Windows® NT, 2000, or XP
- A communications link between the SNMP device and the host computer: local network, Internet or Intranet, utilizing SNMP protocol and static IP addresses
- Availability of IP Port 162 for receiving traps
- TCP/IP connectivity throughout the network

NOTE
Check with your System Administrator about the need to disable certain network or virus protection software.

5.0 SAMPLE NFORM CONFIGURATION

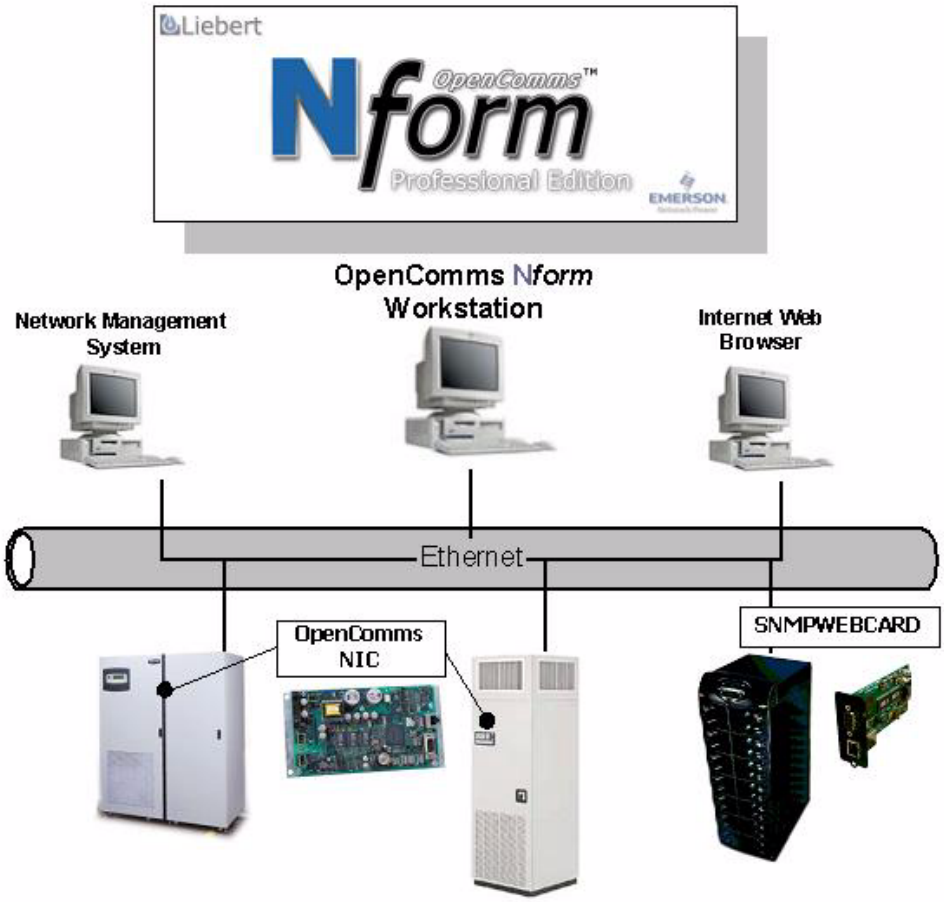
Nform is installed on a single workstation and can be configured to monitor and manage up to 30 SNMP devices by default. The user has the option of expanding Nform's network capabilities with additional licenses. Licenses are available in increments of 30 or 500 additional monitored and managed devices.

Nform is designed to monitor any part of a network. Its functionality permits it to monitor any SNMP-enabled device that can be contacted via local network or the Internet. These devices include those made by Liebert and, with templates available from Liebert, units built by other manufacturers.

Figure 1 shows possible configuration of a monitoring workstation that is monitoring environmental and power protection devices with SNMP cards.

Nform runs on one computer, monitoring the status of the SNMP devices and taking actions based on the configuration settings.

Figure 1 Sample Nform configuration



6.0 INSTALLING THE SOFTWARE

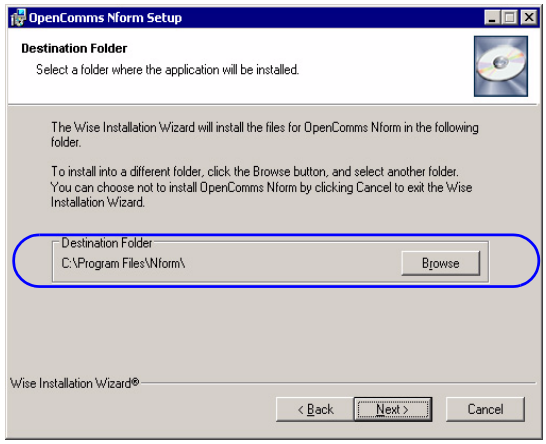
This section explains how to install OpenComms Nform.

- For a first-time installation, follow the instructions in **6.1 - Initial Installation**.
- If you are upgrading to a newer version of Nform and want to keep configuration settings, proceed to **6.3 - Upgrading to a Newer Version of Nform**.

6.1 Initial Installation

- Launch the installation file **Setup.exe** from the CD. One way to do this is:
  - Insert the OpenComms Nform CD in the CD drive.
  - Click on the **Start** button, and then on **Run**.
  - In the Run window, click on **Browse** to locate the file **Setup.exe** on the CD, highlight the file name and click **Open**.
  - Click **OK** to begin installation.
- After viewing the Welcome screens, read the Nform License agreement.
  - If you accept the terms and conditions of the license agreement, click on the **I accept the license agreement** radio button and then click on the **Next** button.
  - If you do not accept the terms and conditions, click on the **I do not accept the license agreement** radio button and then click on **Cancel** to abort the installation.
- In the User Information window, choose whether other computer users will have access to the Nform application:
  - **Anyone who uses this computer**
  - **Only for me *(user name)***
- The Destination Folder window, shown below, displays the location where the software will be installed. Liebert recommends using the default location.

  To select a different location, click on the **Browse** button and choose the location.


OpenComms Nform Setup
Destination Folder
Select a folder where the application will be installed.
The Wise Installation Wizard will install the files for OpenComms Nform in the following folder.
To install into a different folder, click the Browse button, and select another folder.
You can choose not to install OpenComms Nform by clicking Cancel to exit the Wise Installation Wizard.
Destination Folder
C:\Program Files\Nform\
Browse
Wise Installation Wizard®
< Back
Next >
Cancel

- Click on the **Next** button.
- In the Ready to Install the Application window, click on the **Next** button to begin installing the software. A dialog box displays the progress of the installation process, which may take a few minutes.
- A message indicates that installation was successful. Click **Finish** to exit the installation process.

6.2 Controlling Access to Configuration

To protect Nform's configuration settings from unauthorized users, Nform is set up for two classes of users:

- **Administrator**—full access, including configuration capability
- **Power User**—can view and respond to alarms; no access to configuration

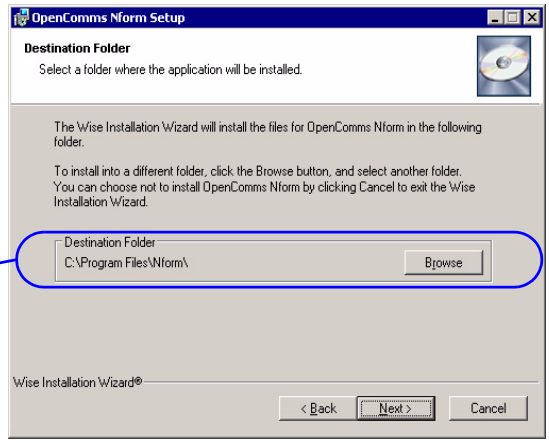
Initially both types of user have a default password, **liebert** (all lowercase). Liebert recommends changing the Administrator password, as described in **8.3 - Change the Administrator Password**, to limit access to configuration settings.

6.3 Upgrading to a Newer Version of Nform

When upgrading to a newer version, the user does not need to remove the existing installation. During the upgrade, Nform preserves all configuration files—for example, configured devices, floor plans, actions.

To install the Nform software upgrade, follow the steps below (for complete details, see **6.1 - Initial Installation**):

- Launch the installation file **Setup.exe** from the CD.
- If you accept the terms and conditions of the Nform license agreement, click on the **I accept the license agreement** radio button and then click on the **Next** button.
- Choose whether other computer users will have access to the Nform application:
  - **Anyone who uses this computer**
  - **Only for me *(user name)***
- The Destination Folder window, shown below, displays the location where the software will be installed. **For upgrades, you must use the same directory path as the previous installation of Nform to keep your configuration settings.**


OpenComms Nform Setup
Destination Folder
Select a folder where the application will be installed.
The Wise Installation Wizard will install the files for OpenComms Nform in the following folder.
To install into a different folder, click the Browse button, and select another folder.
You can choose not to install OpenComms Nform by clicking Cancel to exit the Wise Installation Wizard.
Destination Folder
C:\Program Files\Nform\
Browse
Wise Installation Wizard®
< Back
Next >
Cancel

For upgrades, use the same directory path as previous installation to keep configuration settings

- Follow the prompts to complete the installation.

The next time you start Nform, all previous configuration settings should be in place.

7.0 OVERVIEW OF NFORM NET EVENT MANAGER

This section provides a quick look at the features available with various SNMP devices and the functions accessible through Nform's tabs, menus and toolbar buttons.

The Nform Net Event Manager's two tabs—Navigate and Configure—logically divide Nform's functionality.

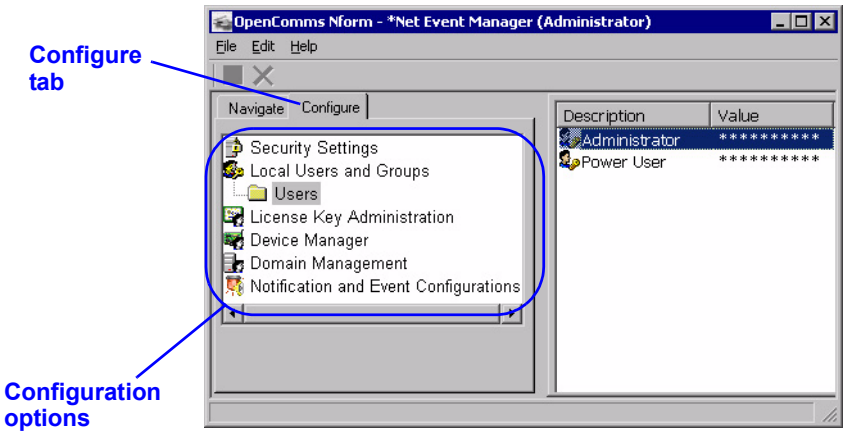
- The **Navigate** tab displays the operational status and condition of monitored and managed devices. This tab becomes more important after Nform is fully set up.
- The **Configure** tab is the entry point for all setup functions required for Nform to begin monitoring and managing SNMP devices.

7.1 Configure Tab—Overview

Access to the **Configure** tab is limited to the Administrator. This prevents unauthorized users from altering Nform's settings. This tab allows you to:

- Enter the Nform license key(s)
- Set up devices to be monitored and managed by Nform, organized in virtually any fashion
- Add floor plans as visual reminders of device locations
- Specify actions for Nform to take in response to an alarm from any device: send e-mails, add alarm information to a file, and launch scripts
- Set up security precautions, such as changing the Administrator's password

The **Configure** tab, with its various options, is shown below.



The following table shows where to find detailed information about key **Configure** tab functions.

Function	For a detailed description, see:
Enter Nform license, change passwords	**8.0 - Getting Started With Nform**
Add SNMP devices and floor plans to navigation tree	**9.0 - Configuring Nform Devices**
Set up Nform's response to alarms for each device	**10.0 - Notification and Event Configuration**

7.1.1 Configure Menus and Toolbar Buttons

When the **Configure** tab is selected, Nform displays three menus at the top of the window: **File**, **Edit**, and **Help**. Each menu has a drop-down list of options, which appear only when applicable. For example, the **Save** option appears in the **File** menu only when a change needs to be saved.

The Toolbar buttons, which appear directly below the menu, offer alternatives for selected menu options, as shown below. Buttons appear on the Toolbar only when their function is applicable. To display helpful text describing a button's function, hold the mouse over the button. Clicking on the **View** menu and choosing **Show Text Labels** causes labels to appear under the buttons.

Table 1 shows the menu options available in the **Configure** tab and where to learn more about each.

Table 1 Configure Tab Menu Options - Summary

Menu	Option	Toolbar button	Function	For more information, see:
File	**New**	New	Create a new device, floor plan, action, or other item	—
	Save	Save	Save changes to configured items	**8.0 - Getting Started With Nform**
	Exit	—	Quit the Nform application	—
Edit	**Cancel**	Cancel	Abort changes that have not been saved	—
	Delete	Delete	Delete a device, floor plan, action, or other item	—
Help	**About**	—	Check Nform version	—

7.2 Navigate Tab—Overview

The main features of the **Navigate** tab are:

- Viewing summary status, alarm history, and parametric data for any device in the navigation tree
- Tracking alarms in an event log and in user-specified files
- Responding to alarms

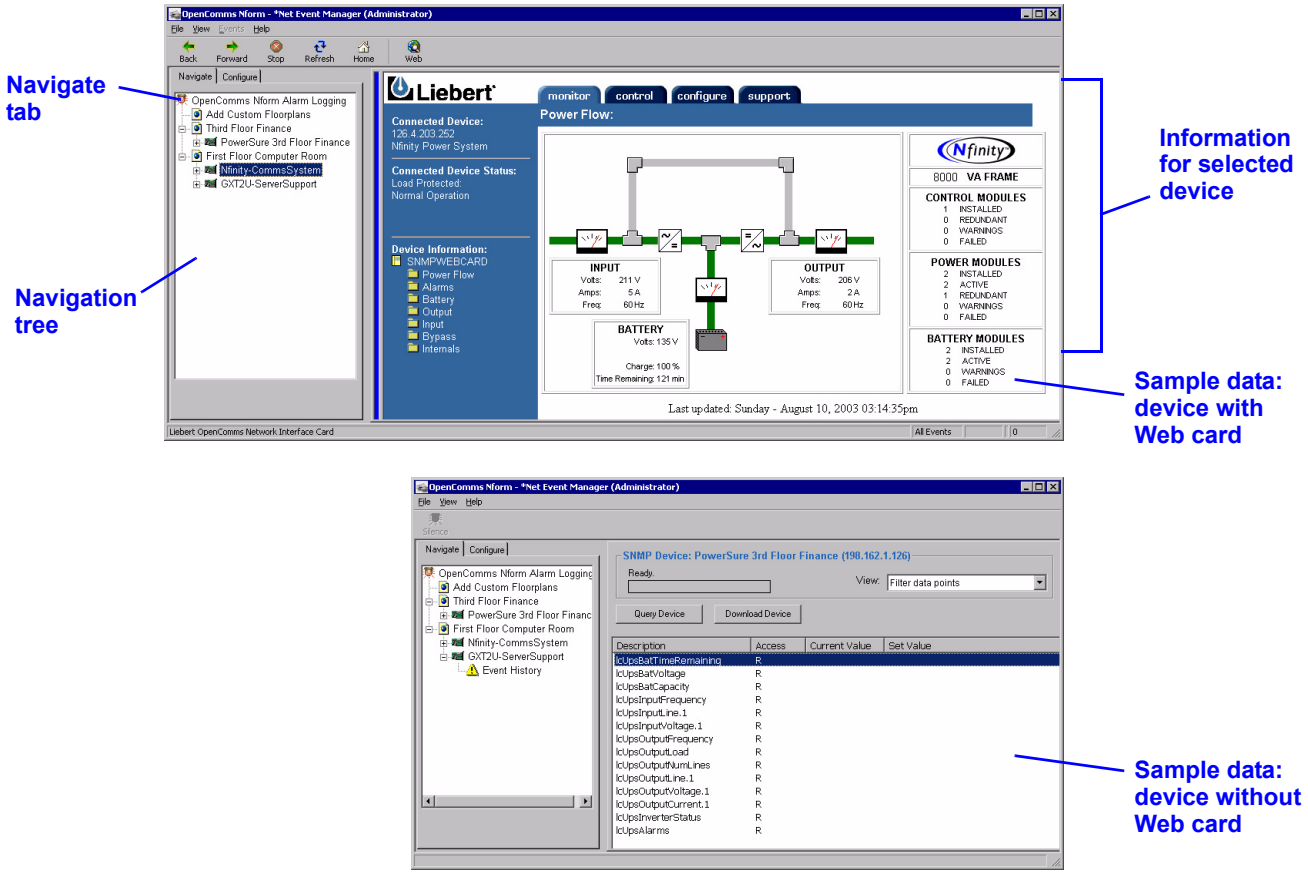
Access to the **Navigate** tab is unlimited; it can be viewed by the Administrator or the Power User group. This permits any authorized user to view the status of monitored, managed devices and respond to alarms.

The **Navigate** tab view varies, depending on the type of SNMP card installed in a device. A device equipped with a Web-enabled SNMP card may be viewed with a Web browser. For devices with an SNMP card that does not support HTML, Nform displays the data in tabular format.

For devices equipped with Web-enabled SNMP cards, the **Navigate** tab may be used to change configuration settings, test a UPS battery and alter other settings.

These functions are performed through the **Control** and **Configure** tabs of the SNMP card's Web display. These HTML tabs may be accessed by any user who has the SNMP card's password. This means that an Nform Power User with the SNMP card password would be able to alter some device settings through the HTML interface.

The Navigate window has two parts. The left side displays all configured devices as a navigation tree, and the right side shows information about any selected item in the tree.


Navigate tab
Navigation tree
Information for selected device
Sample data: device with Web card
Sample data: device without Web card

The table below shows where to find detailed information about the **Navigate** tab's functions.

Function	For a detailed description, see:
View the status of all devices	**11.0 - Nform Monitoring—Navigation Tree**
Manage Nform's alarm log: acknowledge and delete alarms	**12.0 - Managing Alarms**

7.2.1 Navigate Menus and Toolbar Buttons

When the **Navigate** tab is selected, Nform displays up to four menus at the top of the window: **File**, **View**, **Alarms**, and **Help**. Each menu has a drop-down list of options. Menus and options appear only when applicable. For example, the **Alarms** menu is available only when alarms are displayed.

The Toolbar buttons, which appear directly below the menu, offer alternatives for selected menu options, as shown below. Buttons appear on the Toolbar only when their function is applicable. To display helpful text describing a button's function, hold the mouse over the button. Clicking on the **View** menu and choosing **Show Text Labels** causes labels to appear under the buttons.

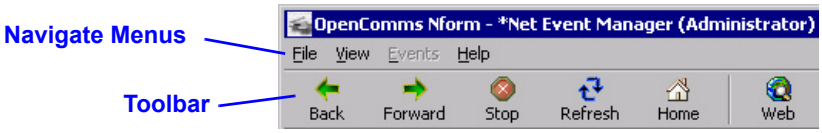


Table 2 shows the menu options available in the **Navigate** tab and where to learn more about each.

Table 2 Navigate Tab Menu Options - Summary

Menu	Option	Toolbar button	Function	For more information, see:
File	**Log On**	—	*(Before logging in)* Log on as Administrator / Power User	**8.2 - Log on as Administrator**
	Lock Application	—	Secure Nform from unauthorized use	—
	Exit	—	Quit the Nform application	—
View *(Navigate tab only)*	**Show Text Labels**	—	Display text below Toolbar buttons	—
	Go To > Back		*For Web pages:* • Return to previous page	—
	Go To > Forward		*For Web pages:* • Move to next page	—
	Go To > Home		*For Web pages:* • Go to Home page http://www.liebert.com	—
	Stop		*For Web pages:* • Stop loading page	—
	Refresh		*For Web pages:* • Update device data	—
	Options	—	Change color for alarm status (active, acknowledged, closed)	**12.7 - Change Colors Indicating Alarm Status**
Alarms *(Navigate tab with alarms displayed)*	**Silence**		Silence an alarm	**12.3 - Silence the Default Beep**
	Acknowledge		Change active alarm status to acknowledged	**12.5.1 - Acknowledge an Alarm**
	Comments		Add comments to an alarm	**12.6 - Add or View Alarm Comments**
	Delete		Remove a closed alarm from alarms listing	**12.5.2 - Delete an Alarm**
Help	**About**	—	Check Nform version	—

7.2.2 Informational Icons in the Navigation Tree

The navigation tree's informational icons change to indicate normal operation, active alarms, communications loss and other conditions of SNMP devices.

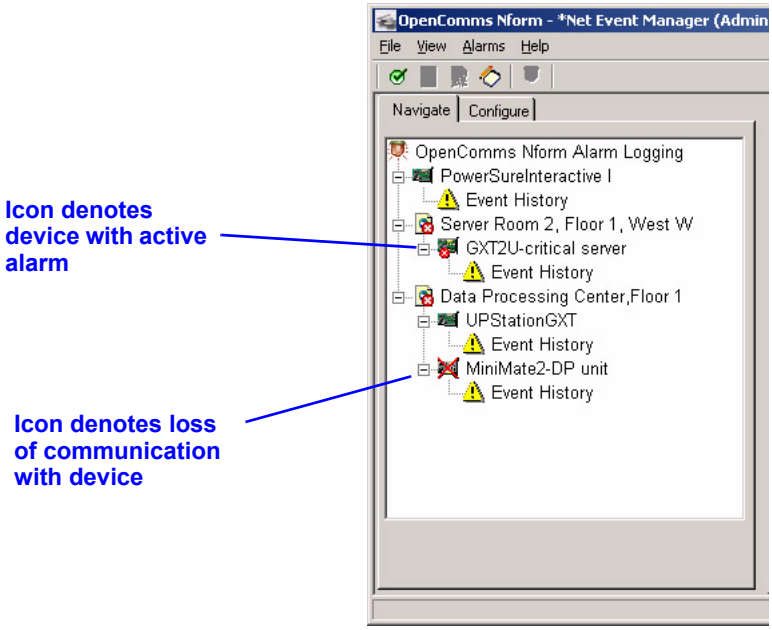


Table 3 summarizes the meaning of icons Nform employs to indicate the status of monitored and managed SNMP devices.

Table 3 Informational Icons - Summary

Status	Toolbar button	Meaning	For more information
Normal operation		Floor plan and all components in normal status	—
		SNMP device in normal status	—
		Event history - shows listing of active and acknowledged alarms	**12.0 - Managing Alarms**
Problem in a component device		Floor plan with at least one component device in alarm or communication loss status	**12.0 - Managing Alarms**
Active alarm		Device in active alarm status	**12.0 - Managing Alarms**
Communication loss		No communication with device	See **Note** below

NOTE
When Nform displays this icon , verify that your network cables are connected. If further action is required, consult your SNMP card user manual.

7.3 Nform Features

Table 4 lists the features available in Nform.

Table 4 Features Available in Nform

Feature	Liebert OpenComms Nform
Real Time Monitoring	Yes
Broad Device Support	Yes
Exportable Reports	File Write Capabilities
Centralized Management Console	Yes
Centralized Event Logging	Yes
E-Mail Notification	Yes
Alarm Management	Yes
Authenticated Access	Yes
Device Status Polling	Yes
Auto Logoff (Enhanced Security)	Yes
Customized Floorplans	Yes
Customized System Topologies	Yes
License Key Administration	Yes
Alarm Filtering	Yes
Run External Program Capability	Yes
Able to Monitor Non-Proprietary SNMP Devices	Yes
Central UPS Management	Yes
Supported Operating Systems	Windows NT 4.0 w/SP6 or higher, Windows 2000, Windows XP
Supported Browsers	N/A
Supported SNMP Devices	All UPS, Environmental, Power Distribution, and Monitoring products manufactured by Liebert or others that support an SNMP interface
License Packages	Available in 30 and 500 node increments

8.0 GETTING STARTED WITH NFORM

After installing the software, you should change the default password for security purposes and enter the license key so you can begin configuring devices for monitoring.

Some changes to Nform's configuration are saved automatically; others will need to be saved before they take effect. If these buttons appear on the toolbar and are illuminated (not grayed-out), you must save changes in either of the following ways:

- Click on the **File** menu at the top of the window, and then click on **Save**.

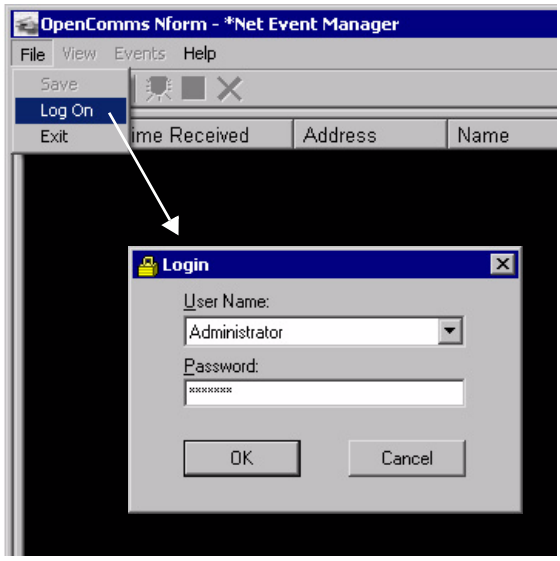
  or
- Click on the **Save** button on the toolbar.

8.1 Start Nform

To start the application:

- Click on the **Start** button, then on **Programs**, then on **OpenComms Nform**, and finally on **OpenComms Nform**.

Nform opens and displays a blank screen, as shown at right. This remains until the user logs on as either Administrator or Power User.



8.2 Log on as Administrator

The Administrator user name permits full access for configuring the software.

To log on as Administrator:

- Click on the **File** menu at the top of the window, then click on **Log On**.
- In the Login window, choose **Administrator** (the default) in the User Name box.
- In the Password box, enter the default password, **liebert** (all lowercase letters).
- Click on the **OK** button.

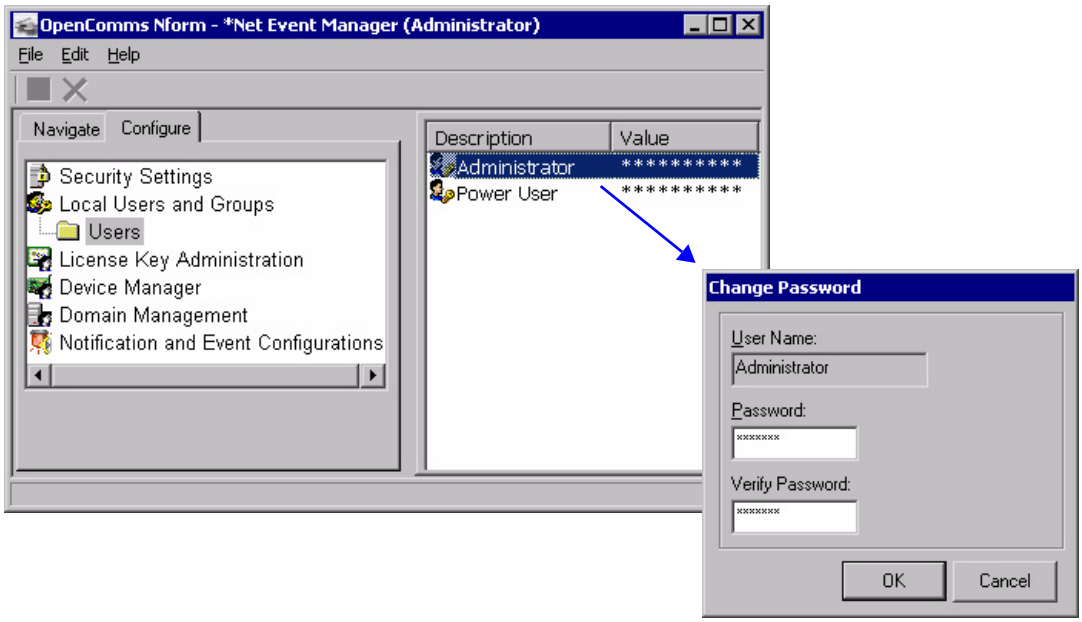
8.3 Change the Administrator Password

The software has two users, Administrator and Power User. The Administrator has full access to configuration and monitoring; the Power User has viewing privileges only. These user names cannot be changed.

The default password for both users is **liebert** (all lowercase letters). Liebert recommends changing the password for the Administrator for security purposes. The password is case-sensitive and may consist of up to eight characters—any combination of letters, numbers or symbols.

To change the Administrator password:

- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **Local Users and Groups**, and then on **Users**.
- In the right side of the window, double-click on **Administrator** to open the Change Password box.
- Enter the new password in the Password box. The password is case-sensitive and may be up to eight characters long (any combination of letters, numbers and other characters).
- Confirm the new password by re-entering it in the Verify Password box.
- Click **OK**.

Follow the same procedure if you wish to change the Power User password. You must be logged on as Administrator to change this password.

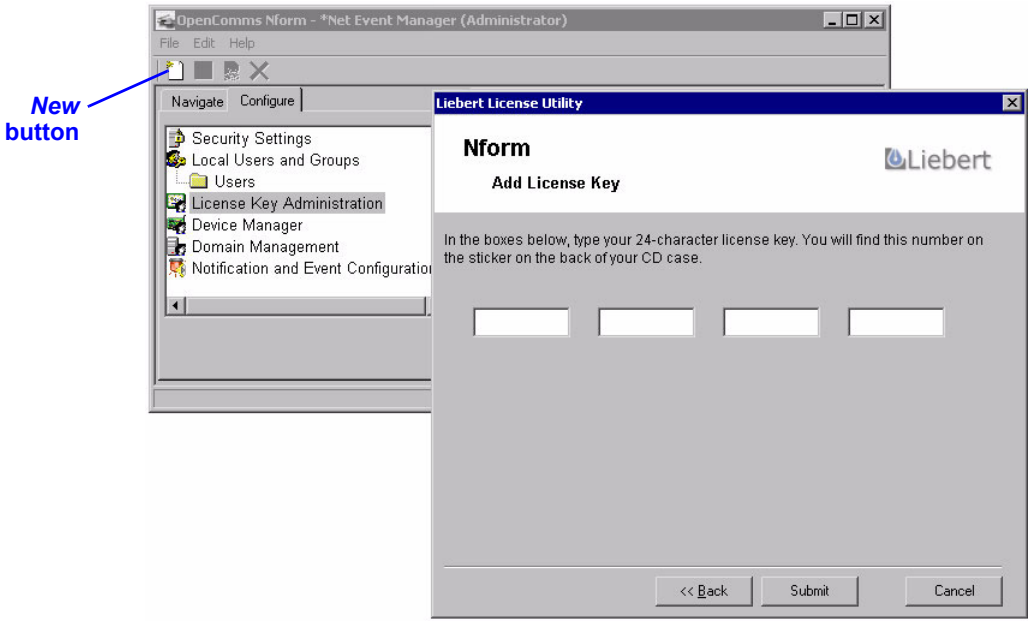
8.4 Enter the License Key

You must install the license key before Nform can be configured to manage and monitor devices and inform users of events and conditions affecting SNMP devices.

The first license key—considered the Primary License Key—allows for one workstation and 30 devices to be monitored. Subsequent licenses each add 30 or 500 devices. Additional license keys are available from Liebert. Contact your local Liebert representative or see **Appendix C - Ordering Parts From Liebert** for information.

To install a license key:

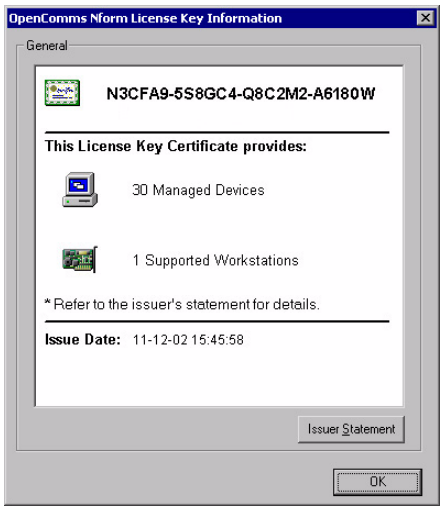
- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **License Key Administration**.
- Click on the **File** menu at the top of the window, then click on **New**. (Instead, you may click on the **New** button on the toolbar.)
- This opens the Liebert License Utility window. Click on **Next**.
- Read the license agreement, and place a check mark in the box to accept the terms.
- Click on the **Next** button.
- Enter the 24-character license key from the sticker on the CD case or the certificate provided by Liebert.
- Click on **Submit**.

The license key number appears on the right side of the window when the **License Key Administration** folder at left is selected. If you have installed more than one license key, the primary license key appears first in the list in the right side of the window.

Double-clicking on the license key number in the right side of the window opens the Nform License Key Information window, as shown at right. This window displays important details about your license, including the license agreement, accessible by clicking on the Issuer Statement button.



Your primary license key cannot be deleted, but you may wish to remove a secondary license key—for example, to move it to another computer to monitor a different group of devices. See **14.2 - Deleting License Keys** for details.

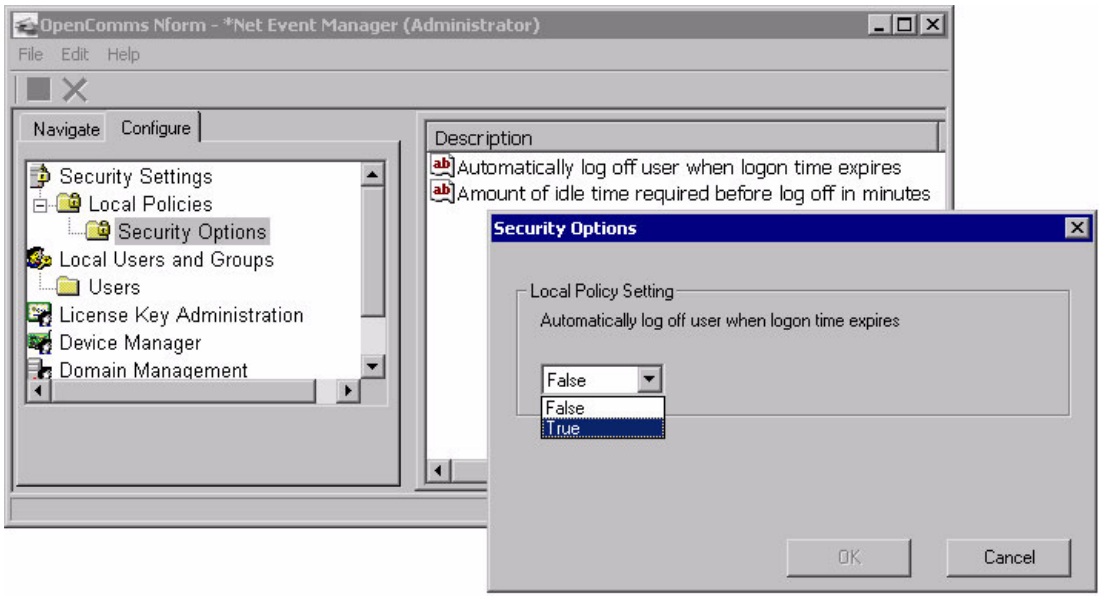
8.5 Set Up Security Settings

As a security precaution, Nform allows you to set up the software to log off automatically after a specified number of minutes. This is intended to prevent unauthorized personnel from using the Administrator's terminal to alter Nform settings.

By default, this feature is disabled (False) with a default idle time (when the feature is enabled) of 25 minutes. Even when this feature is enabled, Nform will not log off the Administrator user when the **Configure** tab is active.

To enable this security option:

- Log on as Administrator.
- Click on the **Configure** tab.
- In the left side of the window, click on **Security Settings**, then on **Local Policies**, and finally on **Security Options**. The right side of the window displays two options.

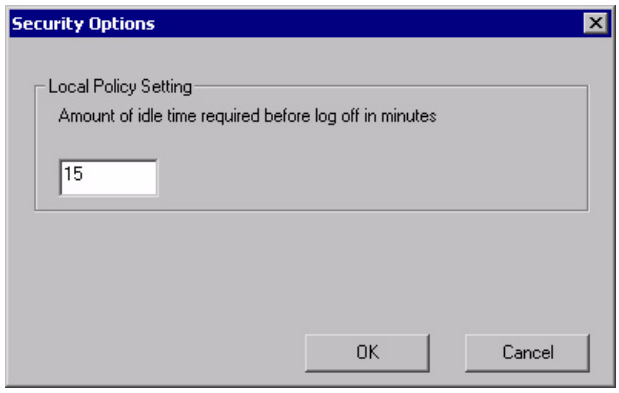


Enable (or Disable) Automatic Logoff

- Double-click on **Automatically log off user when logon time expires** to open the Security Options window, shown above right.
- To enable the automatic logoff, select **True** from the drop-down list and click **OK**.

Change Amount of Time Before Automatic Logoff

- To change the amount of time before the Administrator will be logged off, double-click on **Amount of idle time required before log off in minutes** to open the Security Options window, shown at right.
- Enter the desired idle time in minutes and click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**.
  (Instead, you may click on the **Save** button on the toolbar.)



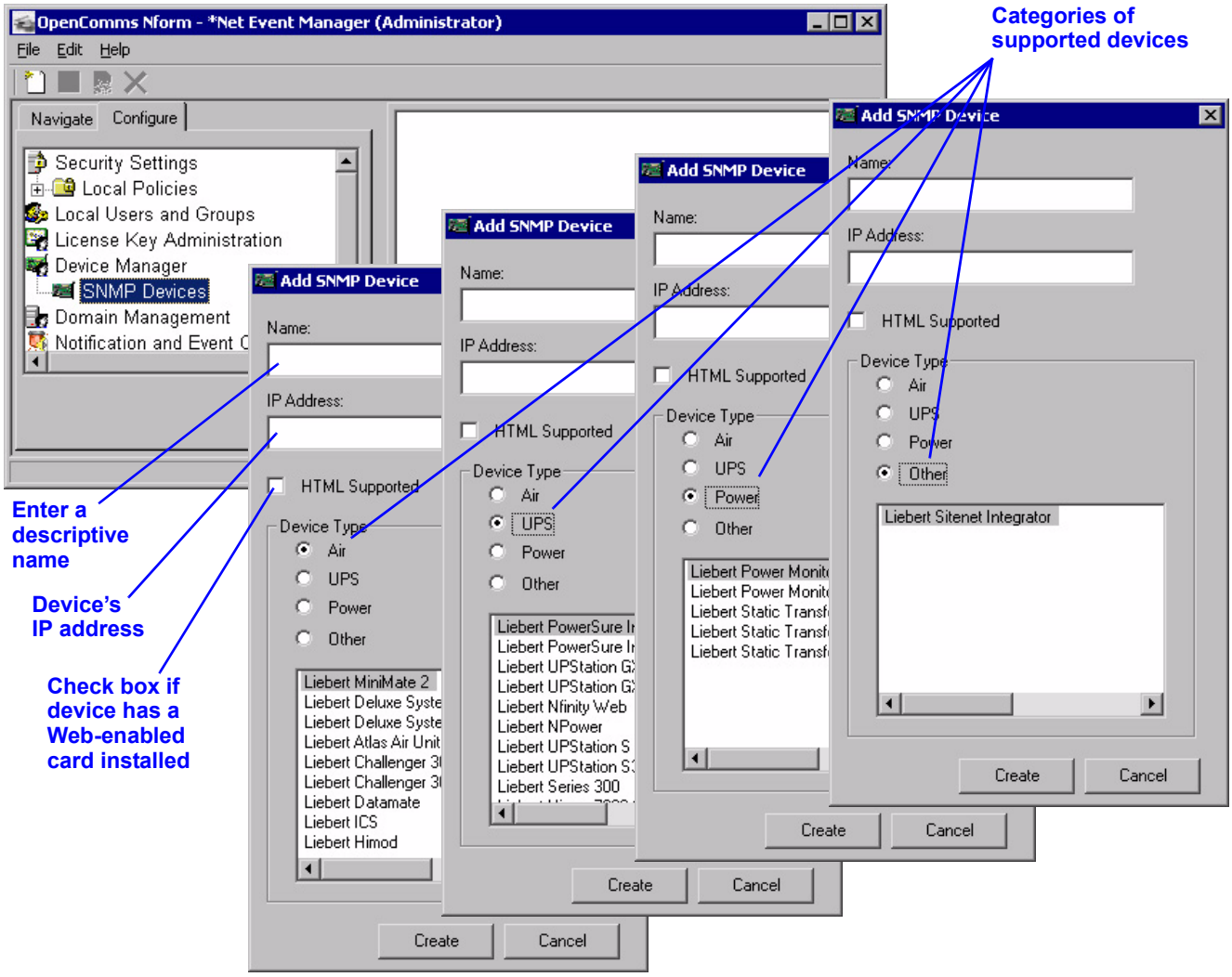
9.0 CONFIGURING NFORM DEVICES

This section describes how to configure devices that will be monitored.

9.1 Add a Device

To add a device:

- Log on as Administrator.
- Click on the **Configure** tab.
- In the left side of the window, click on **Device Manager**, then on **SNMP Devices**.
- Click on the **File** menu at the top of the window, then click on **New**. (Instead, you may click on the **New** button on the toolbar.)
- This opens the Add SNMP Device window, as shown below.



- **Name:** You will need to choose a descriptive name for the device—for example, *Nfinity-1 1st Floor Computer Room*. This name will appear in the navigation tree that displays monitored devices.
- **IP Address:** Enter the device's IP address, which should be available from the System Administrator.
- **HTML Supported:** If the device has an SNMP card that supports a Web interface, place a check mark in this box. This feature allows you to view SNMP queries via a Web browser.
- **Device Type:** Click on the appropriate button—**Air**, **UPS, Power** or **Other**—to display a list of supported devices, and then click on the name of the device from the displayed list.
- Click on the **Create** button. This opens the SNMP Devices window, as shown in **9.2 - Set Up the Device**.

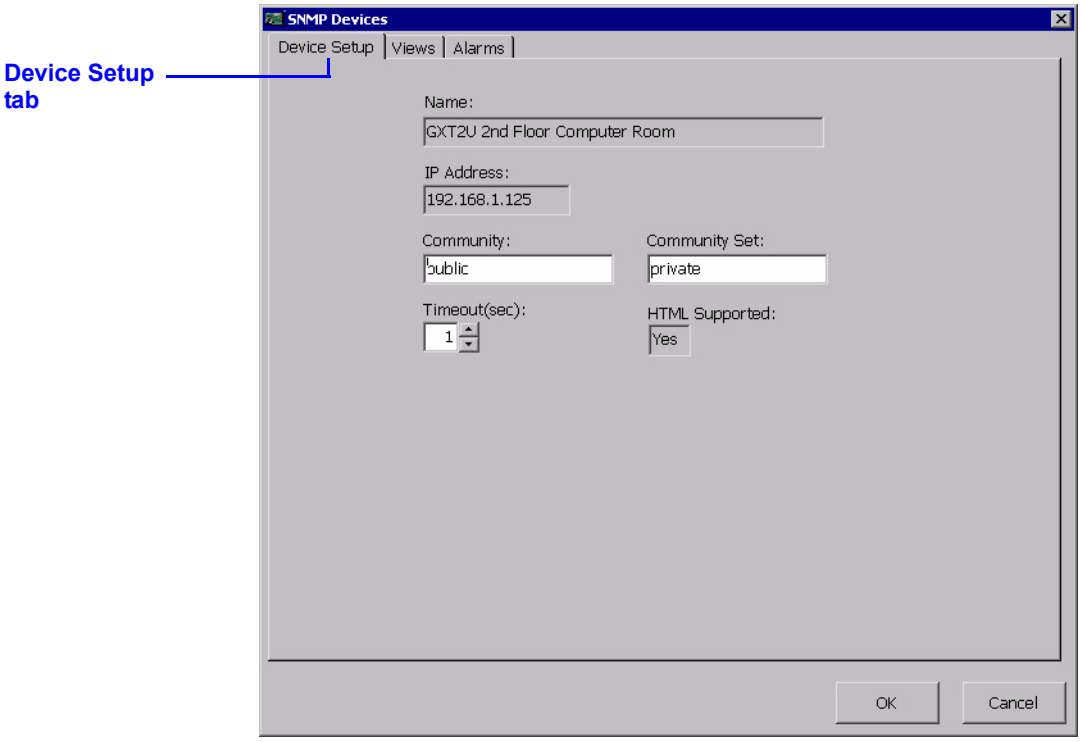
9.2 Set Up the Device

The SNMP Devices window has three tabs:

- The Device Setup tab allow you to enter a community string and timeout value.
- The Views tab lets you determine which informational items appear in the **Navigate** tab.
- The Alarms tab allows you to set up alarms and corresponding actions.

9.2.1 Device Setup tab

The window opens with the Device Setup tab selected, as shown below.



Shaded boxes do not require entry; they simply display device information, such as name and IP address, that was entered in the Add SNMP Device window (described in the previous section).

- Enter a community string in the Community box. The community string entered in this box must match the community string entered in the SNMP card. The community string is case-sensitive.
- The Community Set box can be used to configure the community string for a device that has a secondary IP address and community string configured for Read-Write or Set access. In most cases, the value configured in the Community box, which is the Read-Only setting.
- The Timeout box designates the number of seconds for a device to respond to an SNMP query. The default value is 1 second; Liebert suggests this value is appropriate in most cases. (If you receive an excessive number of timeout error messages, you might consider increasing the time.)
- Click **OK**.
- A message window asks if you want to add this device to the navigation tree.
  - Click **Yes** if you wish to add the device to the navigation tree now. Then proceed to **9.3 - Add Devices to Navigation Tree**.

NOTE

If you are configuring several SNMP devices, it may be more convenient to wait until the last device is configured before adding them to the navigation tree. Click ***No*** *for all devices except the last one.*

9.2.2 Views tab

The Views tab displays the types of data that can be retrieved from an SNMP device and displayed in the **Navigate** tab as the Filtered View—for example, the type of device, model number and device status.

Liebert supplies a template for each SNMP device, containing data points applicable to that device. (See **Appendix B - Data Monitored by Nform** for examples.)

For non-HTML devices, you may select items to be displayed in the Navigate tab. You may also change the name of any item in the list to better suit your operation. Doing so will not change the function of the item, but merely the descriptive text.

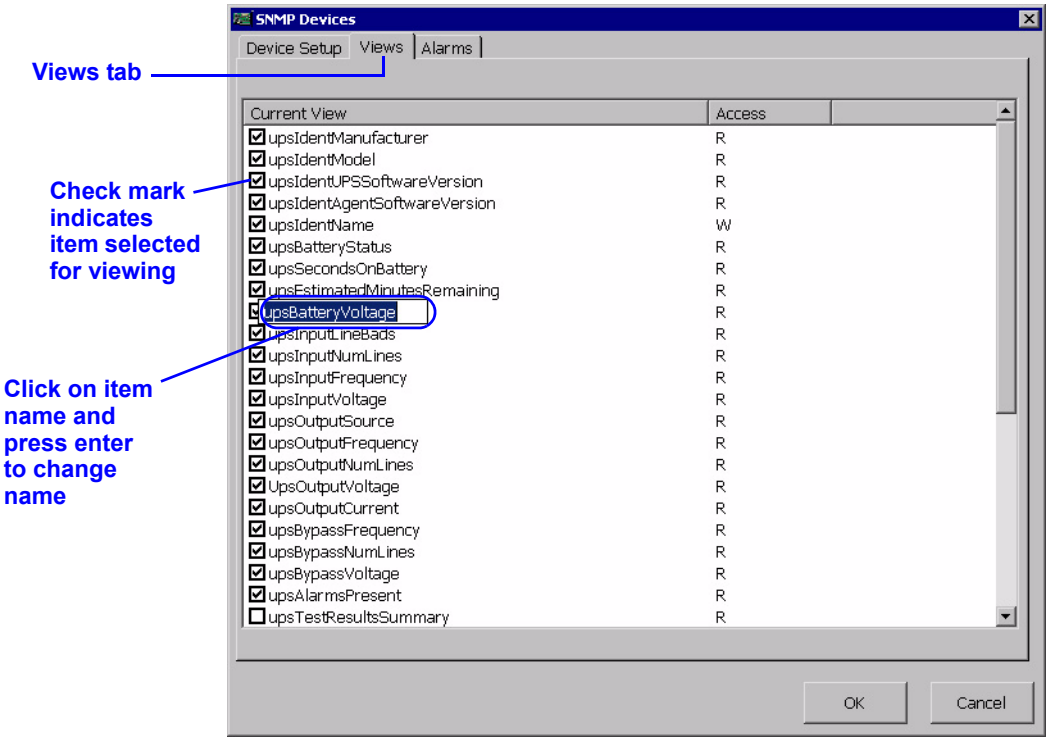
NOTE

The Views tab permits the user to select data to be displayed for non-HTML devices in the Navigate tab.

All HTML devices will present the Web page to the user. Changes made in this window will not affect the data displayed by the Web page.

To select an item or change its name:

- Log on as Administrator.
- Click on the **Configure** tab.
- In the left side of the window, click on **Device Manager**, then on **SNMP Devices**.
- In the right side of the window, double-click on the name of a device.
- In the SNMP Devices window, click on the Views tab, as shown below.



- A check mark (✔) appears to the left of each item selected for viewing. Click in the check box to remove a check mark; click again to place a check mark in the box.
- To change the name of an item, click on the name—for example, *upsBatteryVoltage*—and then press the Enter key. The selected text will be highlighted and editable.

  (As an alternative, you may make the text editable with a standard Windows renaming method: click on an item, wait a short time and click on the item again.)
- Type the new name—for example, *Voltage*—and press the Enter key.
- Click **OK** to return to the **Configure** tab.

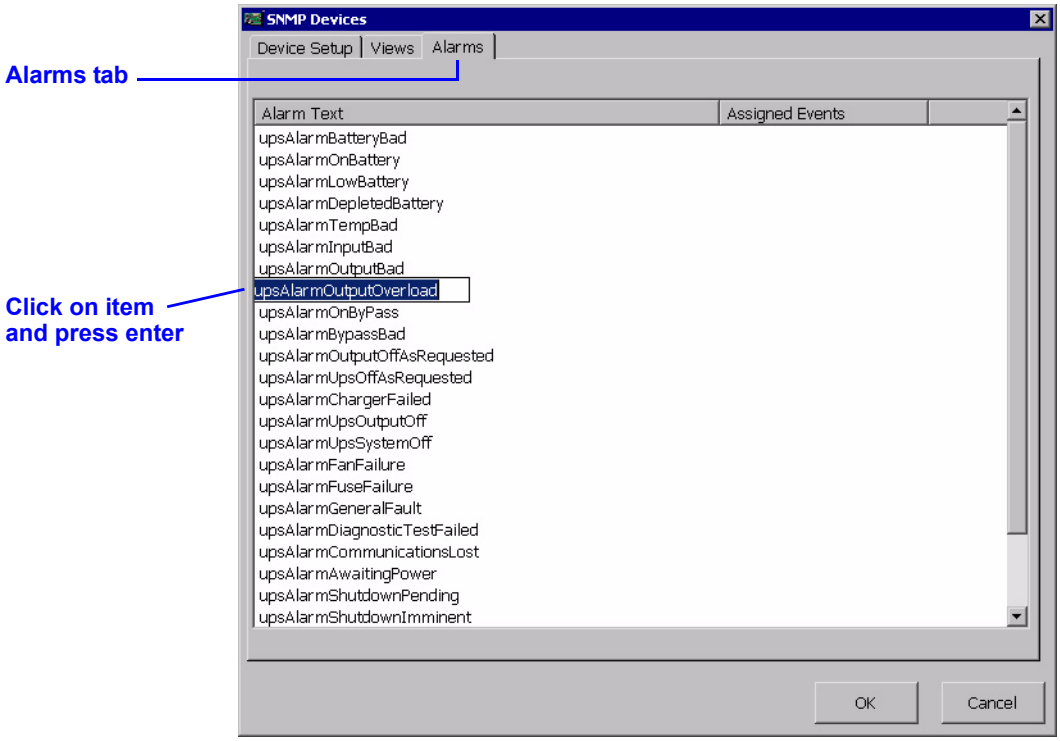
9.2.3 Alarms tab

The Alarms tab allows you to link actions, such as sending an e-mail, to specific alarms—this is described later in **10.2.4 - Assign Actions to Alarms**.

Liebert supplies a template for each SNMP device, containing the types of alarms applicable to that device. (See **Appendix B - Data Monitored by Nform** for examples.)

You may also change the name of an alarm to better mesh with your system or procedures. This does not change the function of the item, but merely the descriptive text. To do this:

- Log on as Administrator.
- Click on the **Configure** tab.
- In the left side of the window, click on **Device Manager**, then on **SNMP Devices**.
- In the right side of the window, double-click on the name of a device.
- In the SNMP Devices window, click on the Alarms tab, as shown below.



- Click on an item—for example, *upsAlarmOutputOverload*—and then press the Enter key. The selected text will be highlighted and editable. (An alternative way to make the text editable is with a standard Windows renaming method: click on an item, wait a short time and click on the item again.)
- Type the new name—for example, *OutputOverload*—and press the Enter key.
- Click **OK** to return to the **Configure** tab.

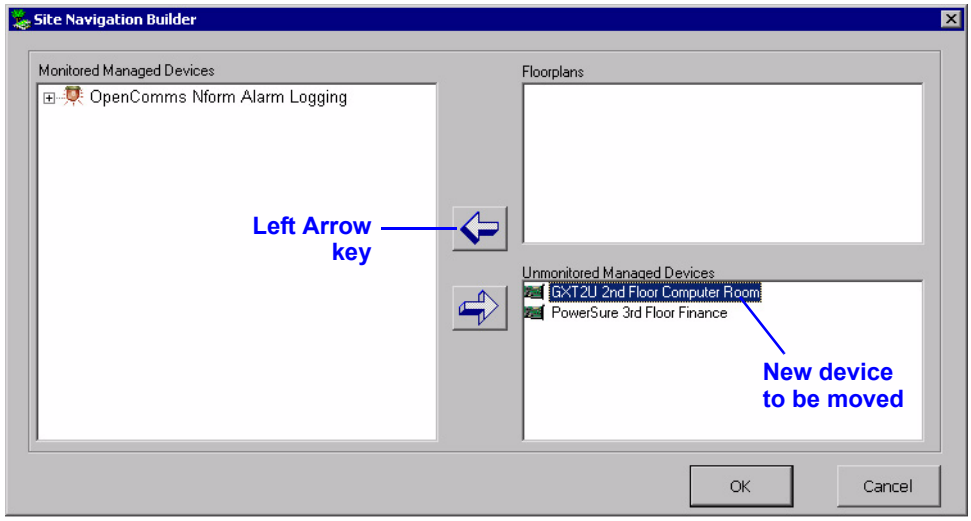
9.3 Add Devices to Navigation Tree

The Navigation tree window allows you to designate which managed devices will be monitored and appear on the Navigate tab.

This window opens if you clicked **Yes** in the final step described in **9.2.1 - Device Setup tab**. Another way to open this window is:

- Click on the **Configure** tab.
- In the left side of the window, click on **Domain Management**
- In the right side of the window, double-click on **Local Domain**, then on **Site Navigation Builder**, and finally on **Default**.

All new devices appear in the Unmonitored Managed Devices portion in the lower right corner.



To add a device to the tree:

- Use drag-and-drop:
  - Click on a device and drag it to the Monitored Managed Devices pane.
  - Release the mouse button when the location where the device belongs is highlighted. If no location is highlighted, the device will be placed under the highest level in the tree—OpenComms Nform Alarm Logging in the example above.

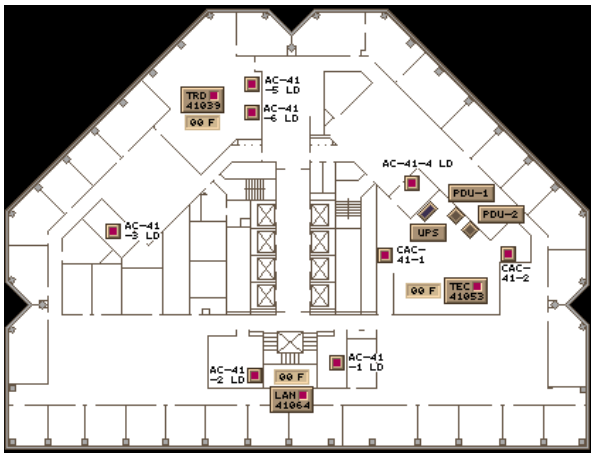
  or
- Use the arrow keys in the center of the window:
  - In the Monitored Managed Devices pane at left, choose a location in the tree where the device belongs—for example, OpenComms Nform Alarm Logging.
  - Then select the device in the Unmonitored Managed Devices pane at right.
  - Click on the Left Arrow key in the center of the window.

Only one device may be moved at a time.

Devices may be moved back to the Unmonitored Managed Devices pane by using drag-and-drop or highlighting a device and then clicking on the Right Arrow key in the center of the window.

- Click **OK** to save changes and return to the **Configure** tab. (To close the window without saving any changes, click on **Cancel**.)

9.4 Add Floor Plans to Show Device Location

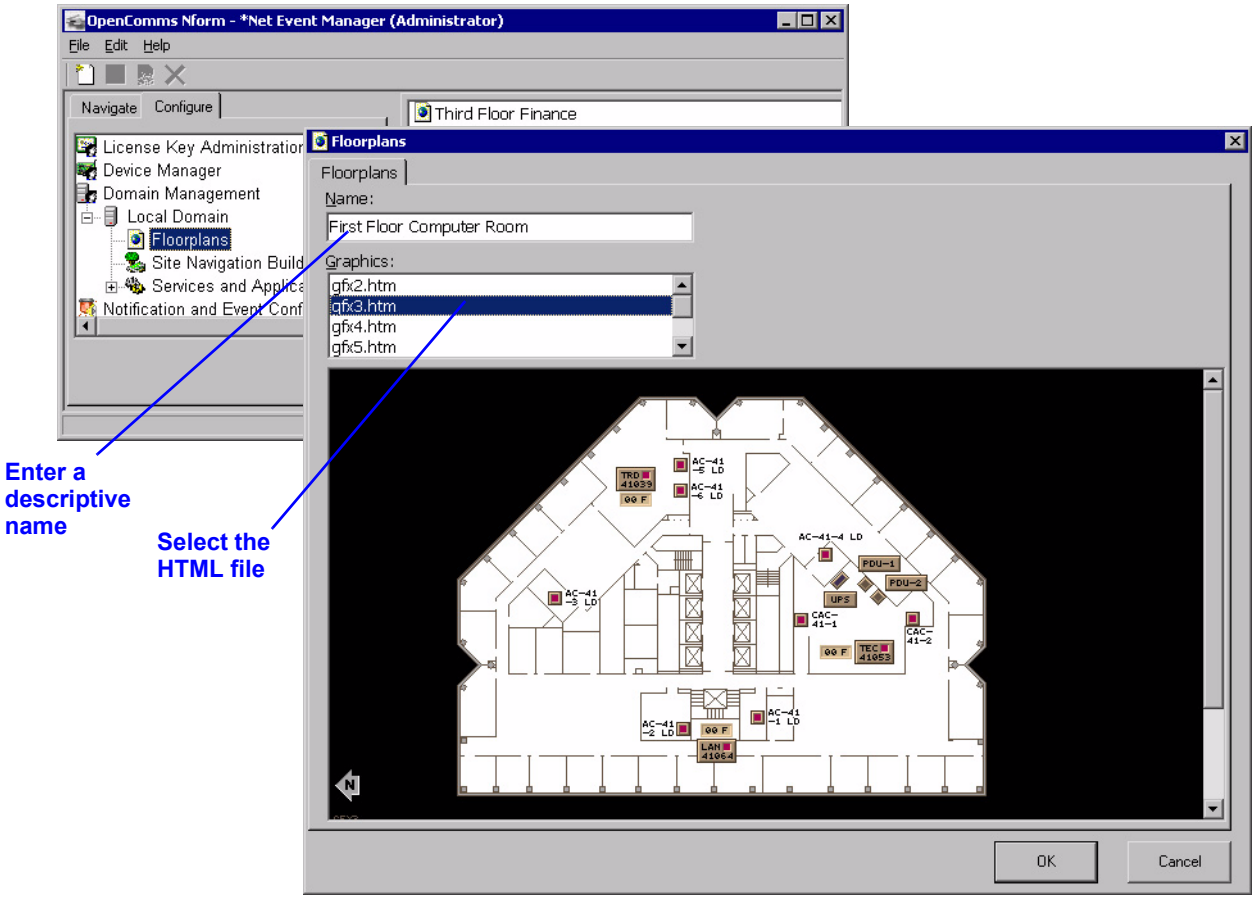


Floor plans may be added to Nform's navigation tree as visual reminders of where devices are located, as in the example shown at right.

Users may design these floor plans or contact Liebert for custom-built plans. Floor plans must be in HTML format and placed in the Floorplans folder as described below.

To add a floor plan:

- Create a floor plan in HTML format.
- Copy the floor plan—the HTML file and any associated graphic files—into the Floorplans folder, which is in the Data folder within the Nform application folder. For example, if the Nform application is located on the **C** drive, the full path would be **C:\Program Files\Nform\Data\Floorplans**.
- Log on as Administrator.
- Click on the **Configure** tab.
- In the left side of the window, click on **Domain Management**
- In the right side of the window, double-click on **Local Domain** and then on **Floorplans**.
- Click on the **File** menu at the top of the window, then click on **New**. (Instead, you may click on the **New** button on the toolbar.)
- This opens the Floorplans window, as shown below.

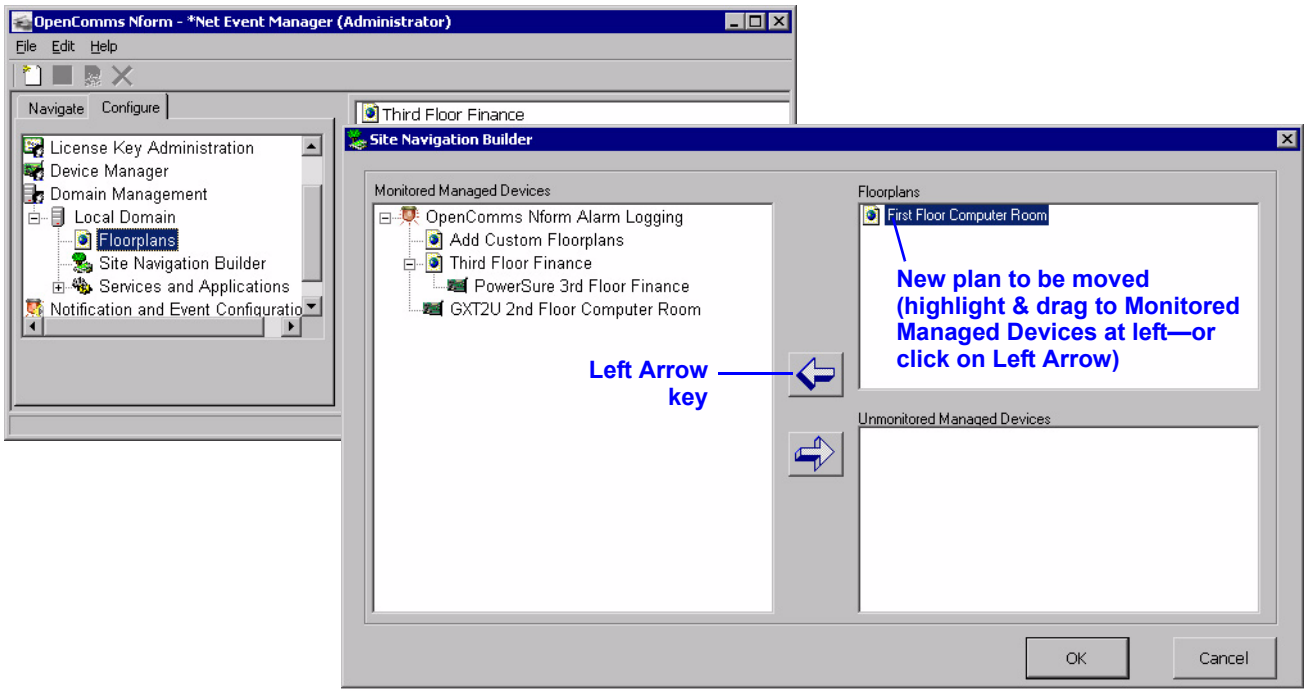


- In the Name box, enter a descriptive name for the floor plan—for example, *First Floor Computer Room* or *Third Floor Finance*.
- Select the HTML file from the Graphics drop-down list. A preview appears in the window.
- Click **OK**. The descriptive name appears in the right pane.

9.5 Add Floor Plans to Navigation Tree

After adding floor plans to Nform, you must also place them in the navigation tree. Managed devices can be placed under the appropriate floor plan to help the System Administrator pinpoint SNMP devices for troubleshooting.

- In the left side of the window, click on **Domain Management**
- In the right side of the window, double-click on **Local Domain**, then on **Site Navigation Builder**, and finally on **Default**.
- This opens the Site Navigation Builder window, as shown below right. All floor plans that have not been moved to the navigation tree appear in the Floorplans portion in the upper right corner.



To move a floor plan to the navigation tree:

- Use drag-and-drop:
  - Drag the floor plan to the Monitored Managed Devices pane.
  - Release the mouse button when the location where the device belongs is highlighted. If no location is highlighted, the floor plan will be placed under the highest level in the tree—OpenComms Nform Alarm Logging in the example above.

  or
- Use the arrow keys in the center of the window:
  - In the Monitored Managed Devices pane at left, choose a location in the tree where the floor plan belongs—for example, OpenComms Nform Alarm Logging.
  - Then select the floor plan in the Unmonitored Managed Devices pane at right.
  - Click on the Left Arrow key in the center of the window.

Only one floor plan may be moved at a time.

Plans may be moved back to the Floorplans pane by using drag-and-drop or by highlighting a floor plan and then clicking on the Right Arrow key in the center of the window.

- To associate a device with a floor plan, click on the device and drag it to the floor plan.

  In the example above, a PowerSure is in the Third Floor Finance department. The other device in the example—GXT 2U—is not associated with any floor plan.
- Click **OK** to save changes and return to the **Configure** tab. (To close the window without saving any changes, click on **Cancel**.)

9.6 Services and Applications

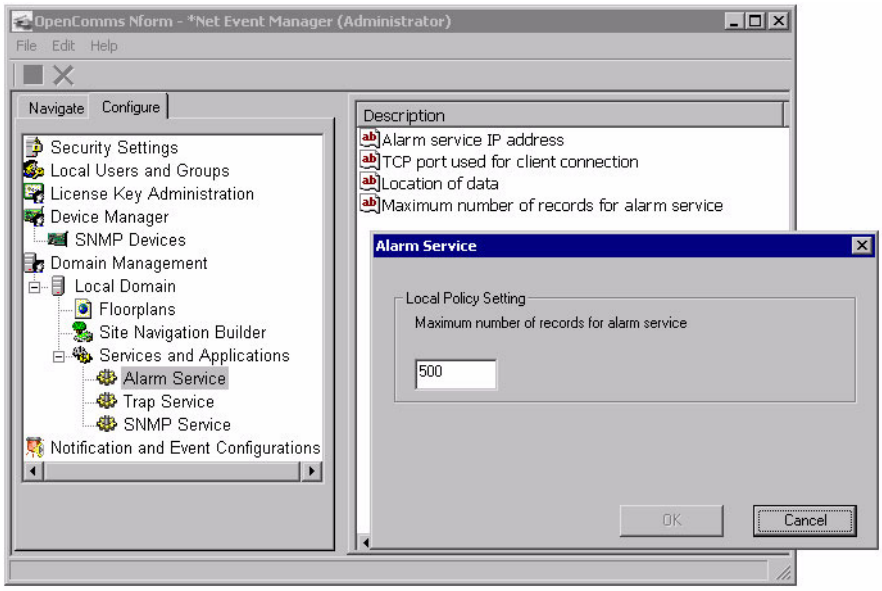
9.6.1 Alarm Service

Nform has four alarm service options:

1. The IP address of the workstation where alarms are reported
2. The port used to connect the SNMP device and the workstation
3. The location for Nform data—for example, floor plans
4. The maximum number of records for the alarm log (maximum allowed is 5,000). When this number is reached, new records continue to be added at the beginning of the log and the oldest records, at the end, are deleted.

Liebert recommends keeping the default values for options **1**, **2** and **3**. To view or change any option:

- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **Domain Management**.
- In the right side of the window, double-click on **Local Domain**, then on **Services and Applications Builder**, and finally on **Alarm Service**. The right side of the window displays four options.
- Double-click on any option to open the Alarm Service window for that option. The example above shows the **Maximum number of records for alarm service** option.
- Enter the appropriate change and click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**. (Instead, you may click on the **Save** button on the toolbar.)
- A message window advises that the change may not take effect until after the computer is restarted. Click **OK**.

9.6.2 Trap Service

The Trap Service is responsible for receiving and processing alarm notifications, or traps, from managed devices. Diagnostic features in this service can be used to troubleshoot network communication problems between OpenComms Nform and SNMP devices.

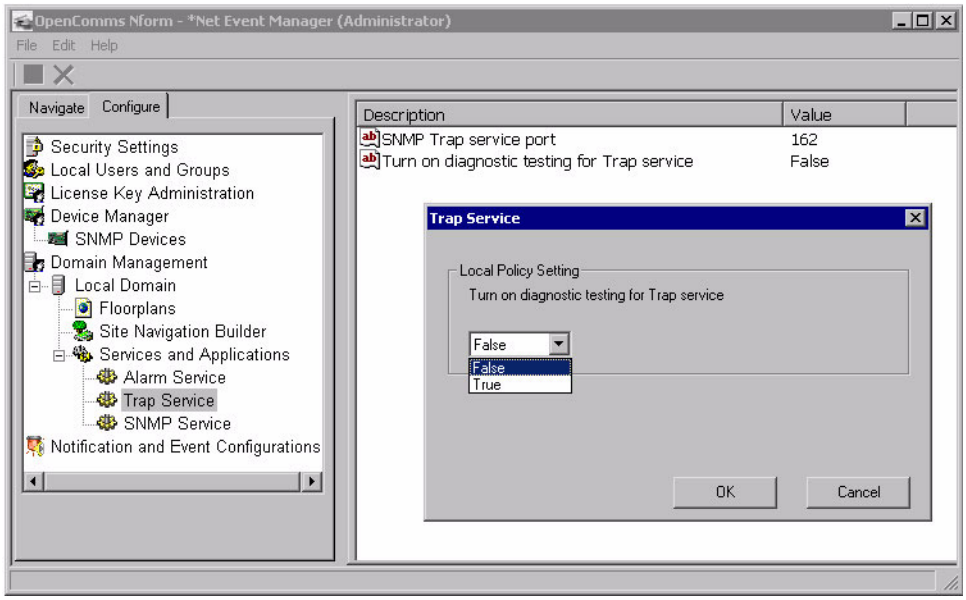
The trap service has two options:

- The trap port—by default, this is 162.
- A diagnostic testing mode—by default, this feature is disabled.

  Note: Use the diagnostic mode with caution. Diagnostic testing mode should be enabled only at the request of a Liebert application support or field engineer. When enabled, this feature records all received traps in a file called *snmp.txt*. This file is not managed and therefore can become very large and cause the computer to crash.

Liebert recommends keeping the default values for these options. To view or change either option:

- Log on as Administrator.
- Click on the **Configure** tab.



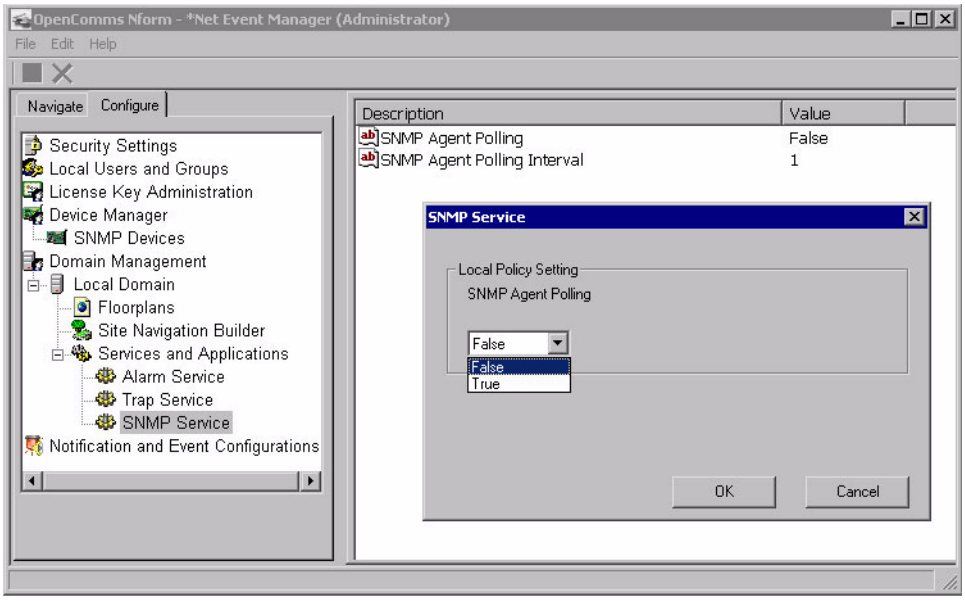
- In the left side of the window, click on **Domain Management**.
- In the right side of the window, double-click on **Local Domain**, then on **Services and Applications Builder**, and finally on **Trap Service**. The right side of the window displays two options.
- Double-click on any option to open the Alarm Service window for that option. The example above shows the **Turn on diagnostic testing for Trap service** option.
- Enter the appropriate change and click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**. (Instead, you may click on the **Save** button on the toolbar.)
- A message window advises that the change may not take effect until after the computer is restarted. Click **OK**.

9.6.3 SNMP Service

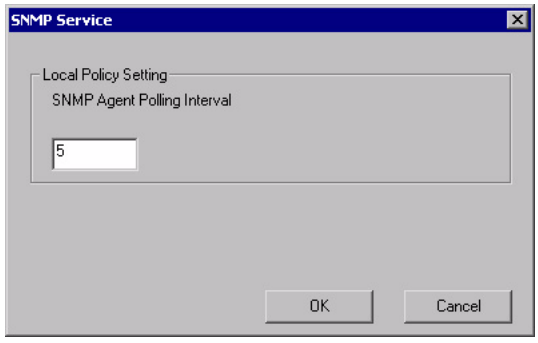
Nform allows you to set up the software to poll devices for their status at a specified interval. This feature causes the device icons to show whether any alarms are present, the status is normal or the polled agent is not responding. If there is no communication with a device, its icon in the Navigate tab bears a large red X . See **7.2.2 - Informational Icons in the Navigation Tree**. When Nform displays this icon, verify that your network cables are connected. If further action is required, consult your SNMP card user manual.

By default, this feature is disabled (False) with a default interval of five minutes. To change this feature:

- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **Domain Management**.
- In the right side of the window, double-click on **Local Domain**, then on **Services and Applications Builder**, and finally on **SNMP Service**. The right side of the window displays two options.
- To activate or deactivate polling, double-click on **SNMP Agent Polling** to open the SNMP Service window, as shown above.
- From the drop-down list select **True** to enable (or **False** to disable) the feature and click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**.
  (Instead, you may click on the **Save** button on the toolbar.)
- A message window advises that the change will not take effect until after the service is restarted. Click **OK**.
- To change the interval between pollings, double-click on **SNMP Agent Polling Interval** to open the SNMP Service window, as shown at right.



- Enter the desired time in minutes. Liebert recommends setting this time to 5 minutes for the first 30 devices or 15 minutes for the first 500 devices. Increase the polling interval by 1 minute for each 30 devices added; increase the interval by 15 minutes for each 500 devices added.
- Click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**.
  (Instead, you may click on the **Save** button on the toolbar.)
- A message window advises that the change may not take effect until after the computer is restarted. Click **OK**.

10.0 NOTIFICATION AND EVENT CONFIGURATION

This section describes how to configure Nform to alert administrators and users when alarms are received. It also details how to set up Nform to respond to alarms with certain actions, such as sending e-mails, recording event history, and running an external program to protect data or equipment.

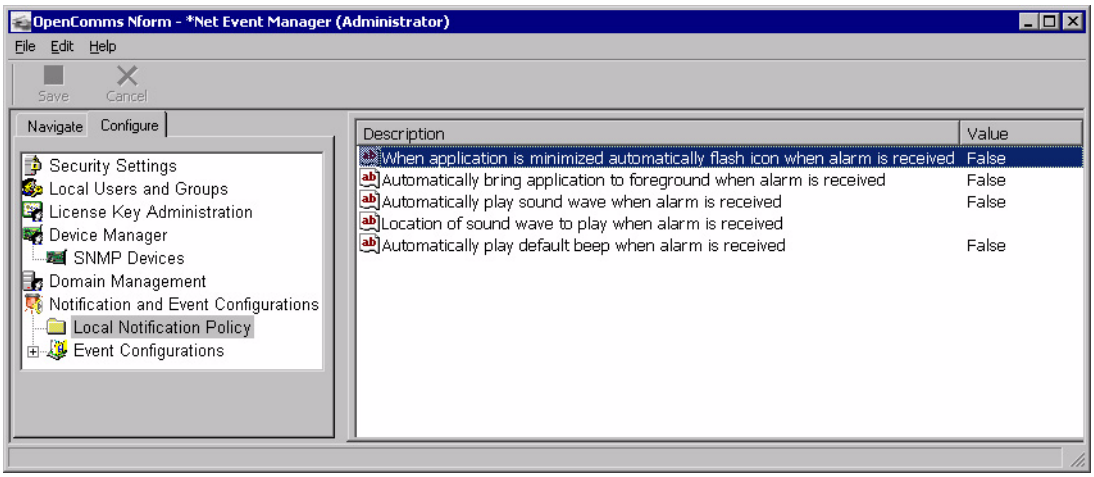
10.1 Local Notification Policy

The Local Notification Policy options allow you to determine the type of visual and audio notifications Nform employs when an alarm is received. The choices include whether to:

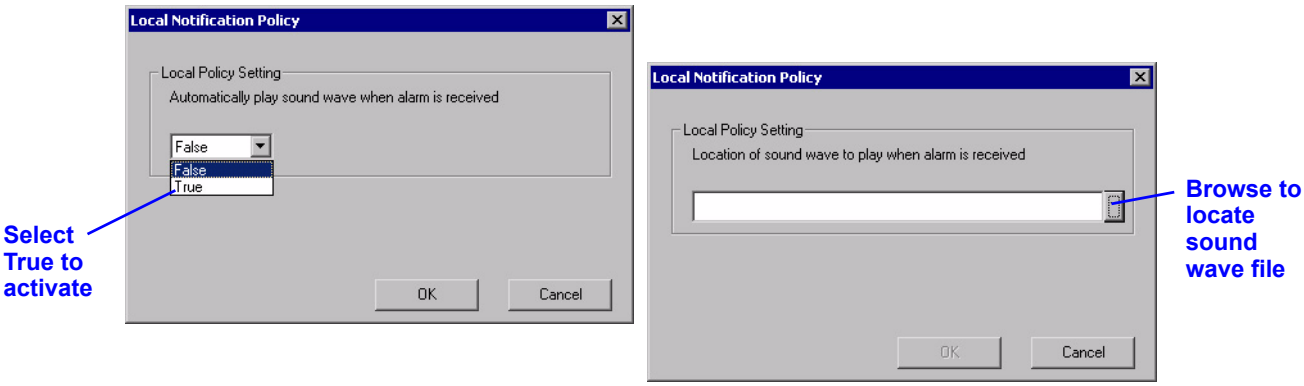
- Bring the minimized Nform application to the foreground or cause it to flash on the taskbar
- Play sounds such as a WAV file, which is played only once, or a continuous beep

To make changes:

- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **Notification and Event Configurations**.
- In the right side of the window, double-click on **Local Notification Policy**. The right side of the window displays options for notification when an alarm is received.
- To change an option, double-click on the option in the right side of the window.



- To enable an option, as shown above at left, select **True** from the drop-down list and click **OK**. (When you enable a sound wave notification, you must also specify the location of the file.)
- To specify the location of a sound wave file, as shown above at right, either enter the full path or click on the browse button to locate the file, and then click **OK**.
- Click on the **File** menu at the top of the window, and then click on **Save**. (Instead, you may click on the **Save** button on the toolbar.)

10.2 Event Configurations

Certain Nform features may be set up to protect valuable equipment, data, and other assets by responding automatically to alarms in SNMP devices affected by such events as power failures, overheating, and mechanical failures.

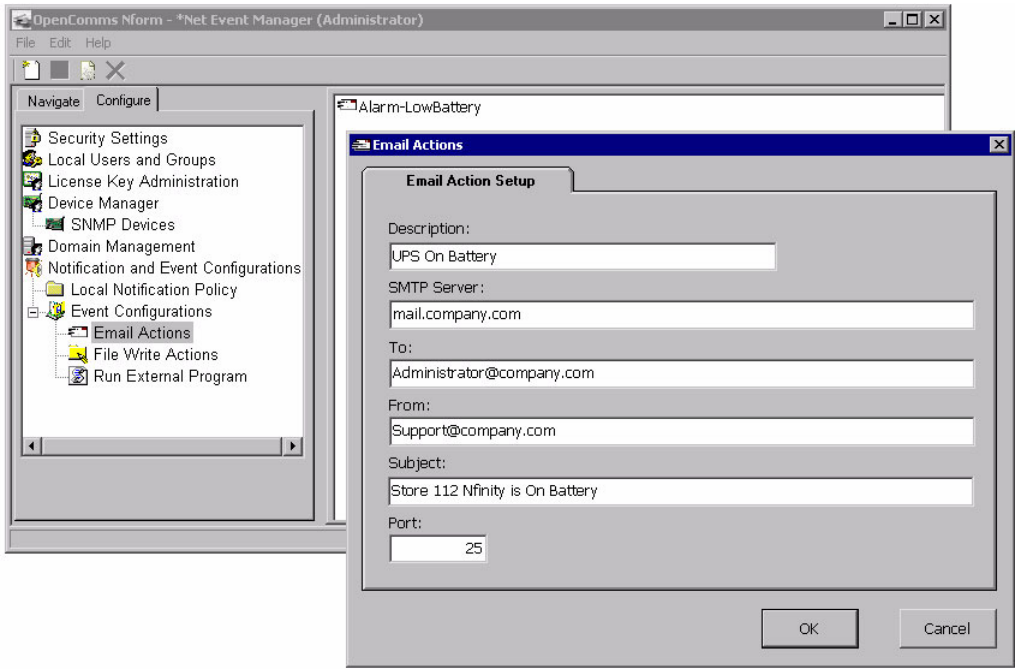
For example, if a cooling unit's performance becomes impaired, Nform could send e-mail alerts to various personnel, record data pertaining to the event and append it to a particular file, and launch a command or batch file that can execute user-customized scripts.

The process entails setting up the actions and tying each to particular events. Actions must be created individually, but multiple actions may be attached to an event in one operation. Further, one action may be attached to multiple events.

10.2.1 Set Up an E-Mail Action

To set up an e-mail:

- Log on as Administrator.
- Click on the **Configure** tab.

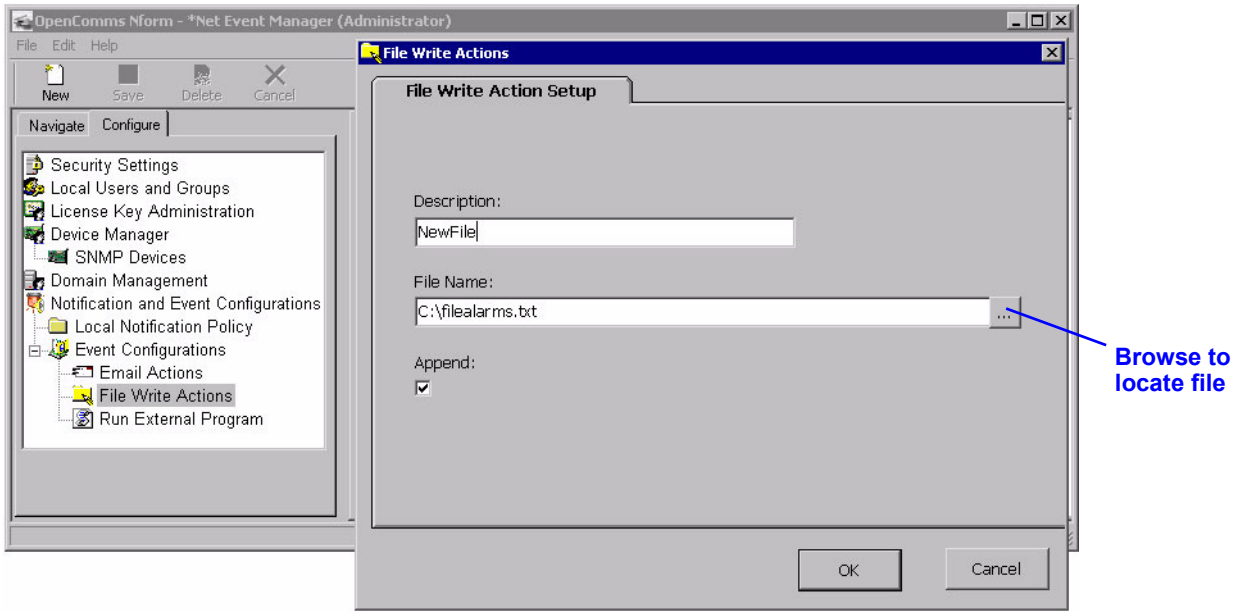


- In the left side of the window, click on **Notification and Event Configurations**.
- In the right side of the window, double-click on **Event Configurations**, and then on **Email Actions**.
- Click on the **File** menu at the top of the window, then click on **New**.
  (Instead, you may click on the **New** button on the toolbar.)
- This opens the Email Actions window, as shown above.
  - Enter a name for this action in the Description box—for example, UPS On Battery. This name should be descriptive because it will appear later on a menu of actions that can be assigned to events.
  - In the SMTP Server box, enter the name of the outgoing mail server that this computer uses for outgoing e-mail—for example, mail.company.com.
  - In the To box, enter the e-mail address of the intended recipient—for example, Administrator@company.com.
  - In the From box, enter the e-mail address of the person to whom replies should be sent—for example, Support@company.com.
  - In the Subject box, enter a subject for the e-mail—for example, Store 112 Nfinity is On Battery.
  - The Port box displays the standard SMTP port of 25.
  - Click **OK**. This saves changes to the Email Action.

10.2.2 Set Up a File Write Action

To set up a File Write Action:

- Log on as Administrator.
- Click on the **Configure** tab.

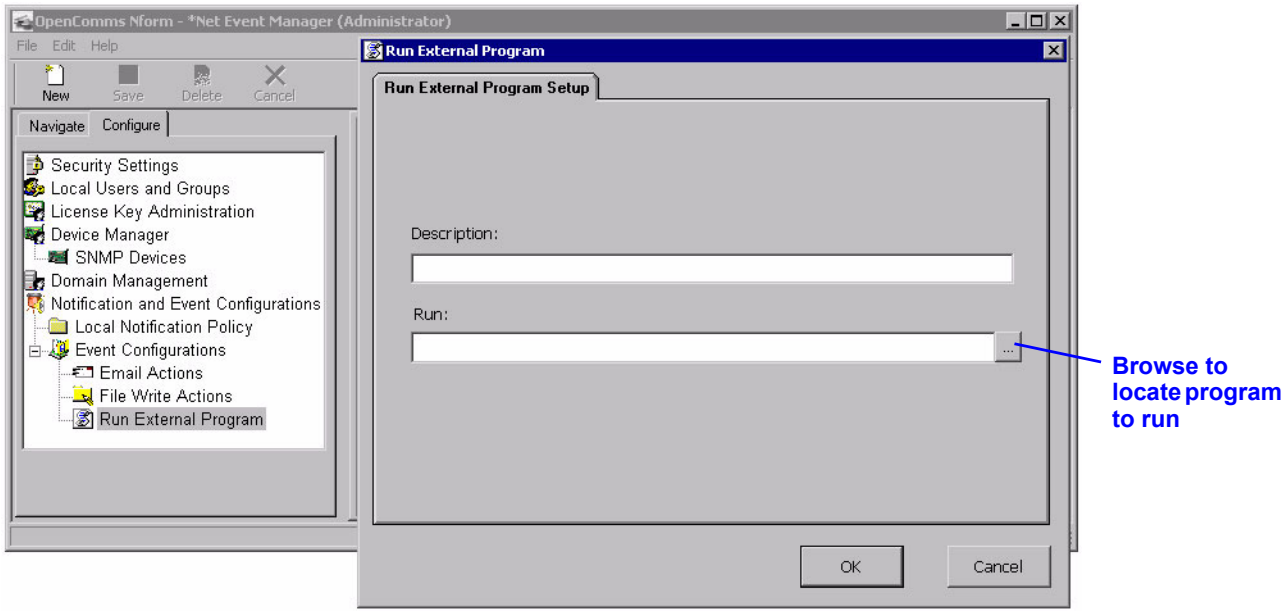


- In the left side of the window, click on **Notification and Event Configurations**.
- In the right side of the window, double-click on **Event Configurations**, and then on **File Write Actions**.
- Click on the **File** menu at the top of the window, then click on **New**.
  (Instead, you may click on the **New** button on the toolbar.)
- This opens the File Write Actions window, as shown above.
  - Enter a name for the action in the Description box. This name should be descriptive because it will appear later on a menu of actions that can be assigned to events.
  - In the File Name box, either enter the full path of the file where Nform will record details of events or use the **Browse** button to locate the file. (To open a browse window, either click on the **Browse** button or double-click in the File Name box.) If the file does not exist, Nform will create it.
  - Placing a check mark in the Append box will prevent existing data from being overwritten by new information.
  - Click **OK**. This saves changes to the File Write Action.

10.2.3 Set Up an External Program to Run

To set up an external program to run:

- Log on as Administrator.
- Click on the **Configure** tab.



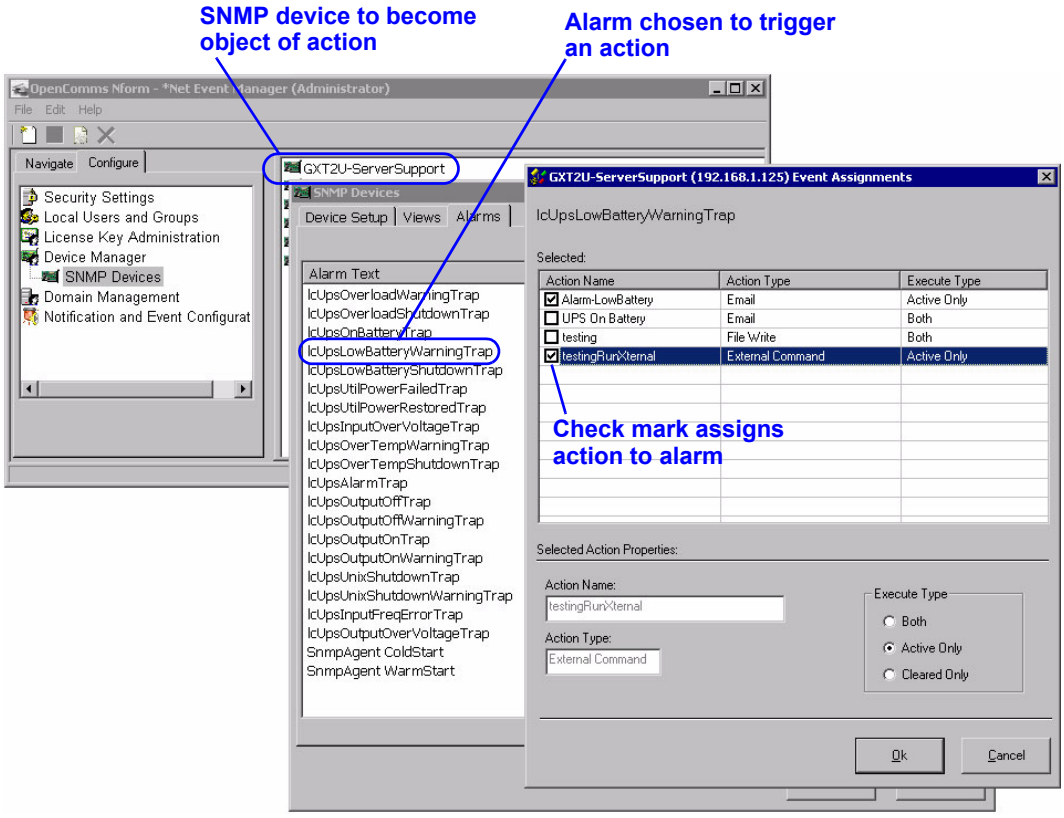
- In the left side of the window, click on **Notification and Event Configurations**.
- In the right side of the window, double-click on **Event Configurations**, and then on **Run External Program**.
- Click on the **File** menu at the top of the window, then click on **New**.
  (Instead, you may click on the **New** button on the toolbar.)
- This opens the Run External Program window, as shown above.
  - Enter a name for the program to be run in the Description box. This name should be descriptive because it will appear later on a menu of actions that can be assigned to events.
  - In the Run box, enter the full path of the program Nform will initiate—either type the full path or use the **Browse** button to locate the file. (To open a browse window, either click on the **Browse** button or double-click in the Run box.)
  - Click **OK**. This saves changes to the Run External Program action.

10.2.4 Assign Actions to Alarms

After an action is created, it must be assigned to an alarm before it becomes operative. An action—for example, sending e-mail notifications—may be assigned to more than one alarm. Nform permits configuring actions separately for each alarm on each managed device. Each action may be set up to be performed at particular stages of an alarm condition: when it occurs, when it is cleared or both (default).

To assign an action to an alarm:

- Log on as Administrator.
- Click on the **Configure** tab, then on **Device Manager**.
- In the right side of the window, double-click on **SNMP Devices**, then double-click on the SNMP device that will be the object of the action.
- Click on the Alarms tab in the SNMP Devices window.
- Double-click on the alarm being set up to prompt a particular action.



The Event Assignments window, shown above right, displays all actions that have been created. For each action you wish to configure:

- Place a check mark beside all actions you wish Nform to take when the selected alarm is received.
- In the Execute Type box, choose when Nform will execute the selected action:
  - **Both** (default) - Action is executed both when an alarm condition occurs and when it is cleared
  - **Active Only** - Action is executed only when an alarm condition occurs
  - **Cleared Only** - Action is executed only when an alarm condition is cleared
- When all actions are configured, click **OK** in the Event Assignments window.
- The SNMP Devices window displays these actions in the Assigned Events column. The first character signifies the type of action:

  @ designates an E-Mail action

  | designates a File Write action

  > designates a Run External Program action

  (Some may be hidden from view because of space restrictions. They can be revealed by double-clicking on an alarm to open the Event Assignments window.)
- Click **OK** in the SNMP Devices window to return to the **Configure** tab.

11.0 NFORM MONITORING—NAVIGATION TREE

Nform constantly monitors the devices set up using the **Configure** tab and performs actions as specified in the configuration settings for each device. This section describes how to use the Nform Net Event Manager to check the status of any SNMP device configured for monitoring.

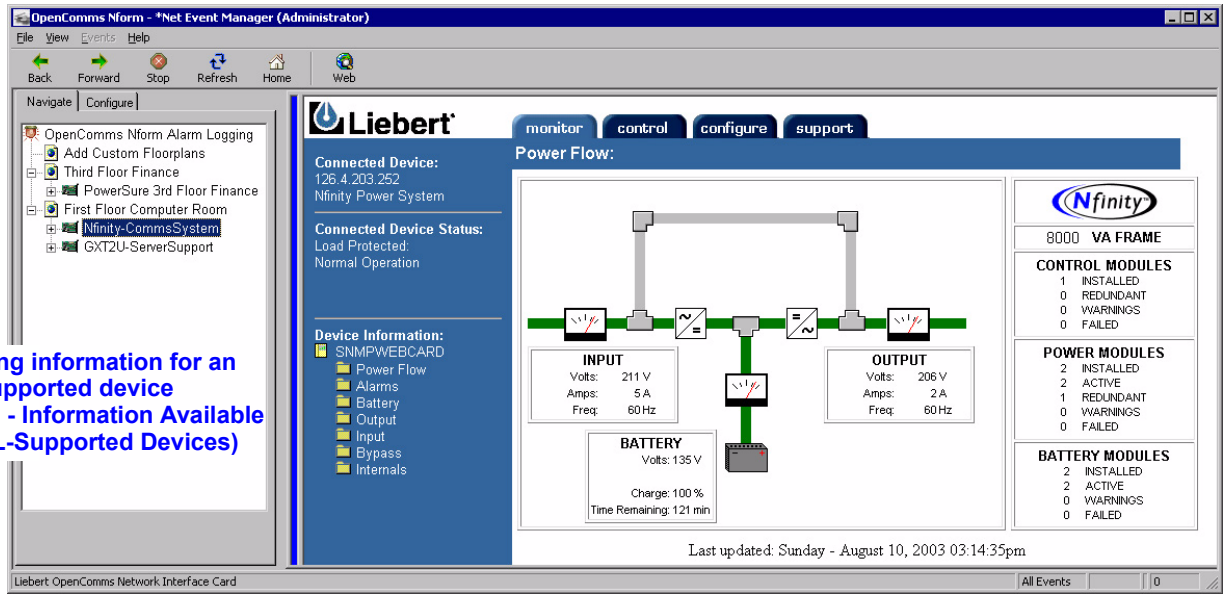
11.1 Viewing the Navigation Tree

The navigation tree allows you to view the status of all configured devices. To view the tree:

- Log on as either Administrator or Power User.
- Click on the **Navigate** tab.
- In the left side of the window, click on the device you wish to view. The device information displayed in the right side of the window has either of two formats, depending on whether the device is HTML-supported or not.

11.1.1 Navigate View—HTML-Supported Devices

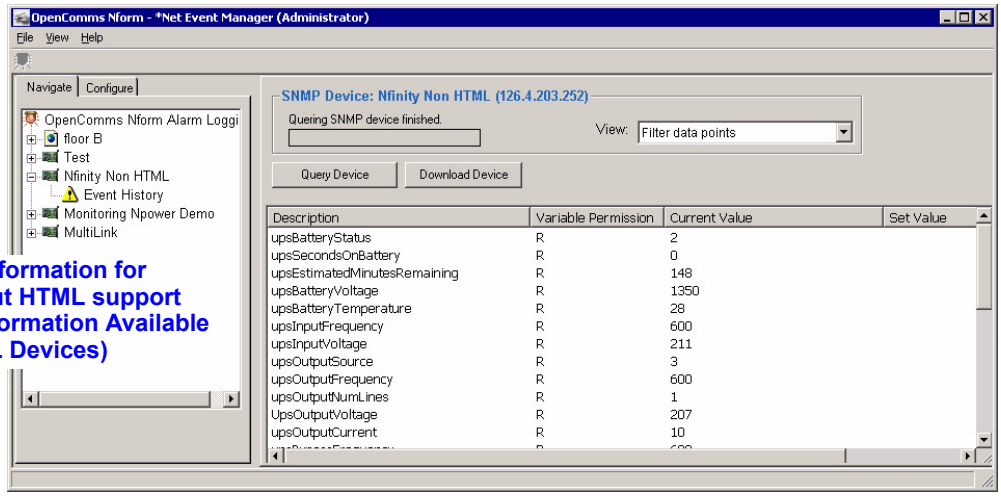
For HTML-supported devices, the right side of the window shows tabs and device information to view and configure. This example shows the **monitor** tab for a device with a Web-enabled card installed.



Monitoring information for an HTML-supported device (see 11.2 - Information Available for HTML-Supported Devices)

11.1.2 Navigate View—Non-HTML Devices

For devices without HTML support, Nform displays device information in a format similar to the window shown below. You may select which data points are displayed or change the description of any item in the device setup (see **9.2.2 - Views tab**).



Monitoring information for device without HTML support (see 11.3 - Information Available for non-HTML Devices)

11.2 Information Available for HTML-Supported Devices

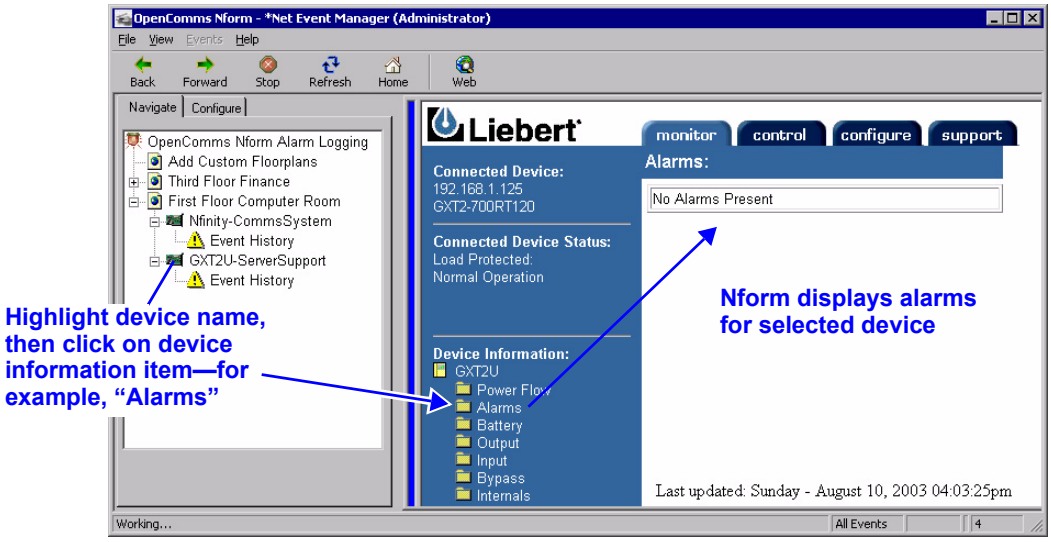
Nform's Navigate window for devices with Web-enabled SNMP cards shows tabs that permit viewing parametric data and altering some device settings. The number of tabs shown depends on the type of device. For more information about device settings, review the documentation related to the SNMP card.

11.2.1 HTML monitor tab

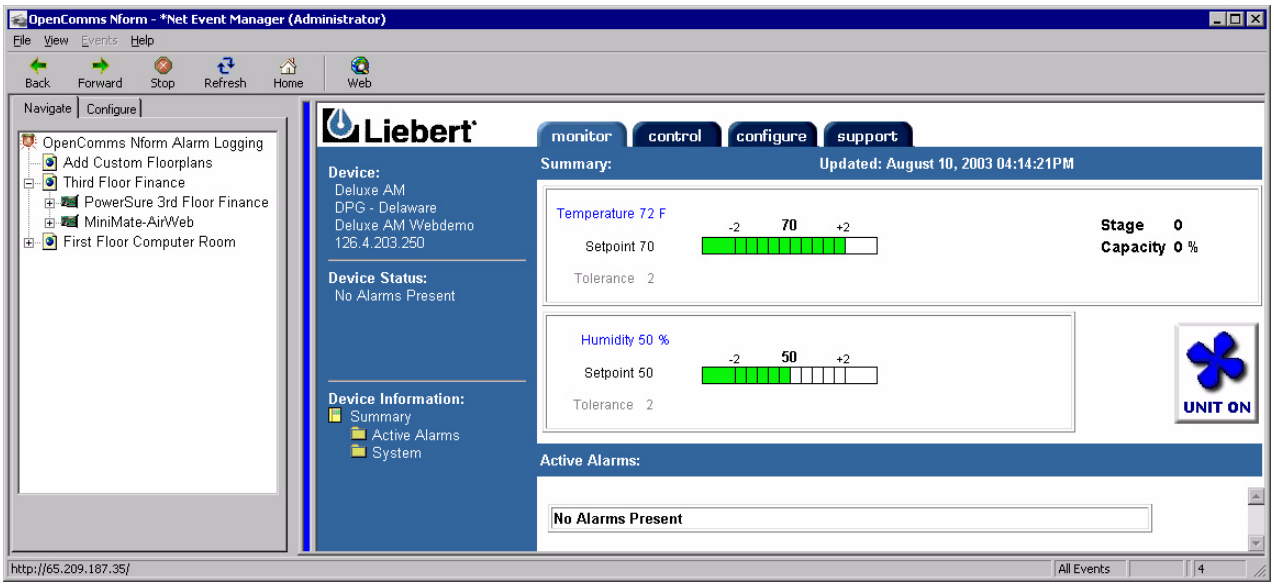
The HTML **monitor** tab for devices with Web-enabled SNMP cards reveals an overview of a selected device: its status, any alarms, and other data applicable to that type of device.

To view the various types of data:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right pane, click on the HTML **monitor** tab.
- In the center of the window, click on the type of device information—for example, **Alarms**. The example below shows Alarm data for an HTML-supported UPS during a power failure.



- The information varies by type of SNMP device. The example below shows summary information for a cooling unit with an SNMP card.

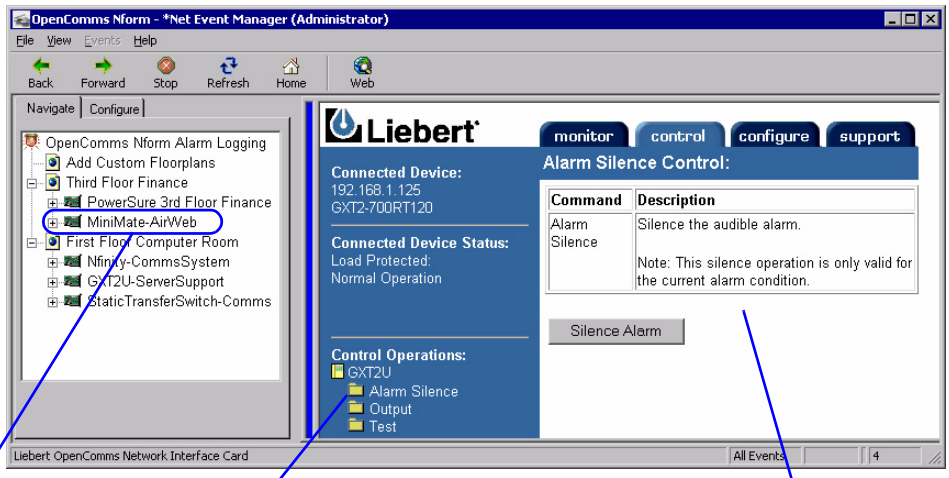


11.2.2 HTML control tab *(selected devices only)*

The HTML **control** tab allows you to take actions such as testing a UPS battery or turning an SNMP device on or off. This tab appears only for certain devices with Web-enabled SNMP cards.

To use the HTML **control** tab:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right pane, click on the HTML **control** tab.
- In the center of the window, click on a control operation—for example, **Alarm Silence**.
- A window asks for the SNMP card user name and password. Enter the user name and password and click **OK**.
- The example below shows the Alarm Silence control function for an HTML-supported UPS.



Highlight device name, then click on control operation—for example, "Alarm Silence"

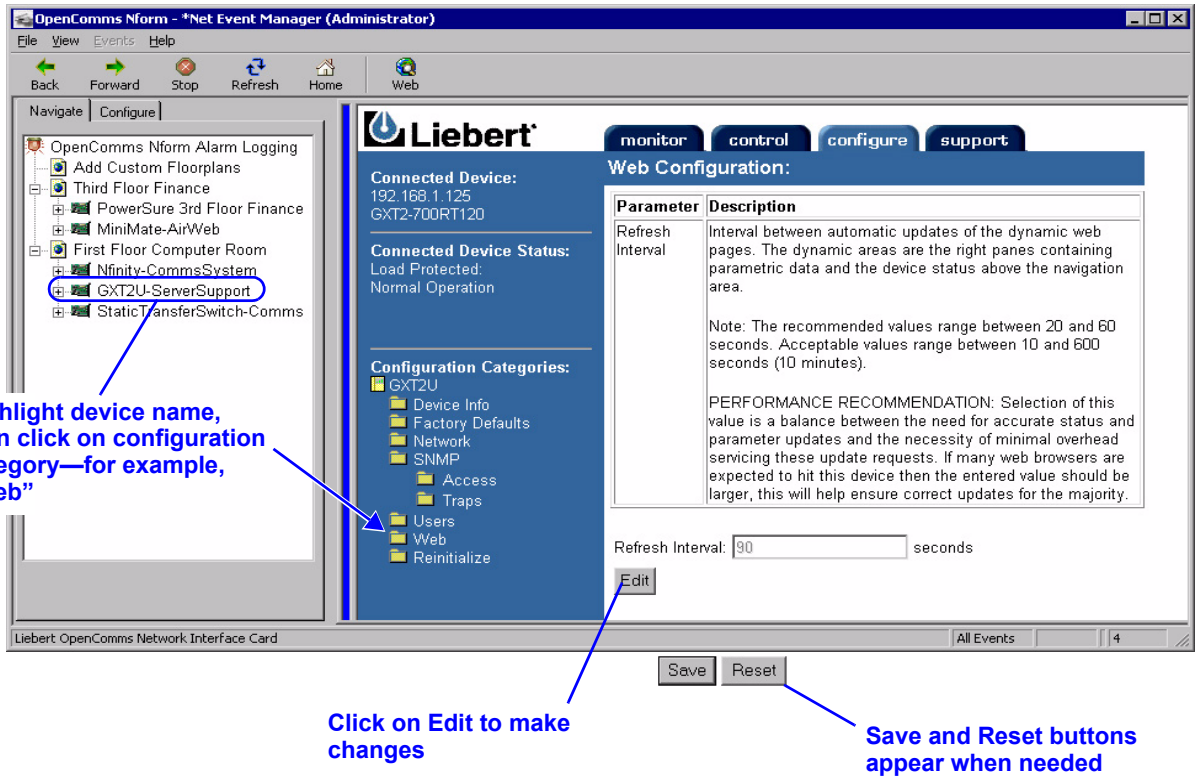
Nform displays information for selected control operation and device

11.2.3 HTML configure tab *(selected devices only)*

The HTML **configure** tab allows you to change some configuration settings in the device's SNMP card. This tab appears only for certain devices with Web-enabled SNMP cards.

To use the HTML **configure** tab:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right pane, click on the HTML **configure** tab.
- A window asks for the user name and password. Enter the user name and password for the SNMP card and click **OK**.
- In the center of the window, click on a configuration function—for example, **Web**. The example below shows the Refresh Interval for an HTML-supported device.


OpenComms Nform - *Net Event Manager (Administrator)
File View Events Help
Back Forward Stop Refresh Home Web
Navigate Configure
OpenComms Nform Alarm Logging
Add Custom Floorplans
Third Floor Finance
PowerSure 3rd Floor Finance
MiniMate-AirWeb
First Floor Computer Room
Nfinity-CommsSystem
GXT2U-ServerSupport
StaticTransferSwitch-Comms
Liebert
monitor control configure support
Connected Device:
192.168.1.125
GXT2-700RT120
Connected Device Status:
Load Protected:
Normal Operation
Configuration Categories:
GXT2U
Device Info
Factory Defaults
Network
SNMP
Access
Traps
Users
Web
Reinitialize
Web Configuration:
Parameter
Description
Refresh Interval
Interval between automatic updates of the dynamic web pages. The dynamic areas are the right panes containing parametric data and the device status above the navigation area.
Note: The recommended values range between 20 and 60 seconds. Acceptable values range between 10 and 600 seconds (10 minutes).
PERFORMANCE RECOMMENDATION: Selection of this value is a balance between the need for accurate status and parameter updates and the necessity of minimal overhead servicing these update requests. If many web browsers are expected to hit this device then the entered value should be larger, this will help ensure correct updates for the majority.
Refresh Interval: 90 seconds
Edit
Liebert OpenComms Network Interface Card
All Events
4
Save
Reset
Highlight device name, then click on configuration category—for example, "Web"
Click on Edit to make changes
Save and Reset buttons appear when needed

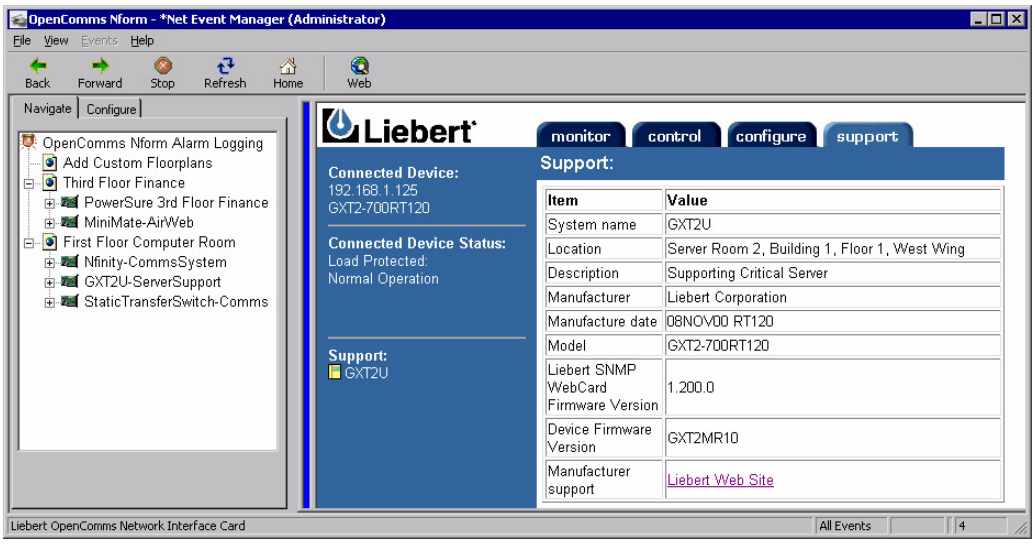
- For each configuration function, a window at right displays information that can be changed on the SNMP card. Click on the **Edit** button to make changes.
- Enter the information you wish to change and click on the **Save** button Save to save the changes (or click on the **Reset** button Reset to exit without saving).
- All changes require re-initializing the SNMP card before the changes will take effect. To do this, click on the **Reinitialize** button Reinitialize.

11.2.4 HTML support tab

The HTML **support** tab displays vital information about the SNMP card and the device, along with technical support contact information.

To use the HTML **support** tab:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right pane, click on the HTML **support** tab. The example below shows device information for an HTML-supported UPS.



11.3 Information Available for non-HTML Devices

For devices without HTML support (non-HTML devices), Nform's Navigate window displays data points—you may select or rename these data points in the device setup (see **9.2.2 - Views tab**).

This section describes how to query the device to display current values. Additionally, you can enter set values for any data point, download those set values to Nform and view the definition of a data point on certain devices.

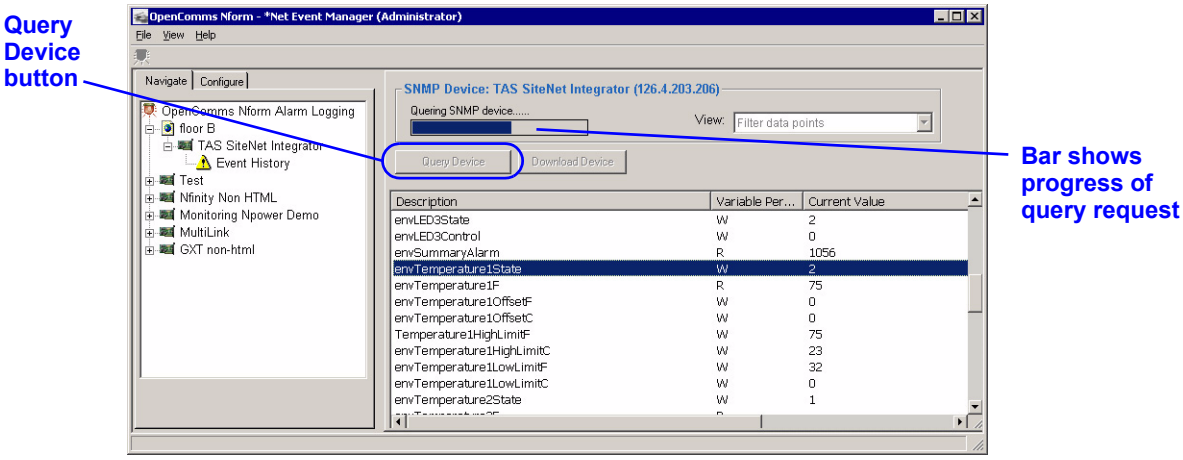
11.3.1 Query Device

Nform allows you to get an immediate update on all data points or for a single data point.

Update All Data Points

To display the device's current values for all data points:

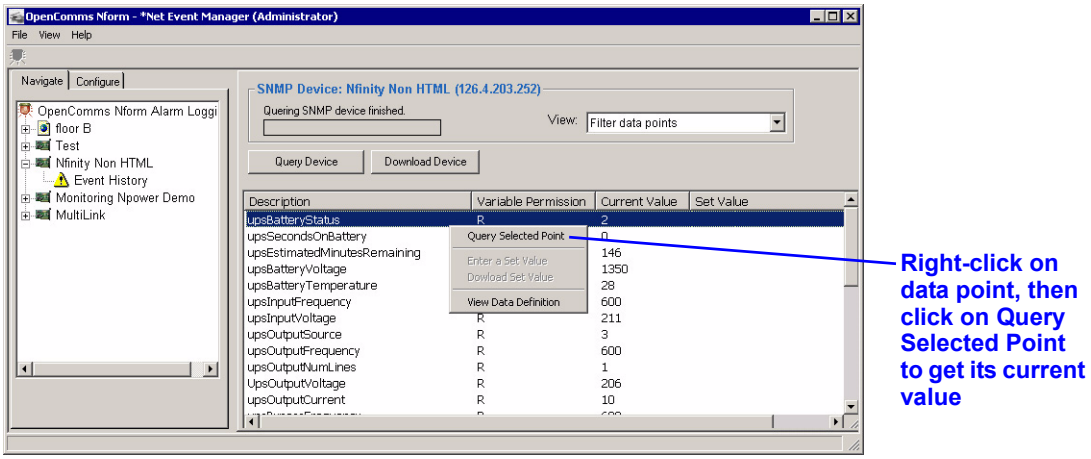
- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right side of the window, click on the **Query Device** button to display the current values; Nform displays a progress bar as it requests SNMP data from the device, as shown below.



Update a Single Data Point

To display the device's current value for a single data point:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right side of the window, right-click on a data point and choose **Query Selected Point** from the pop-up menu.



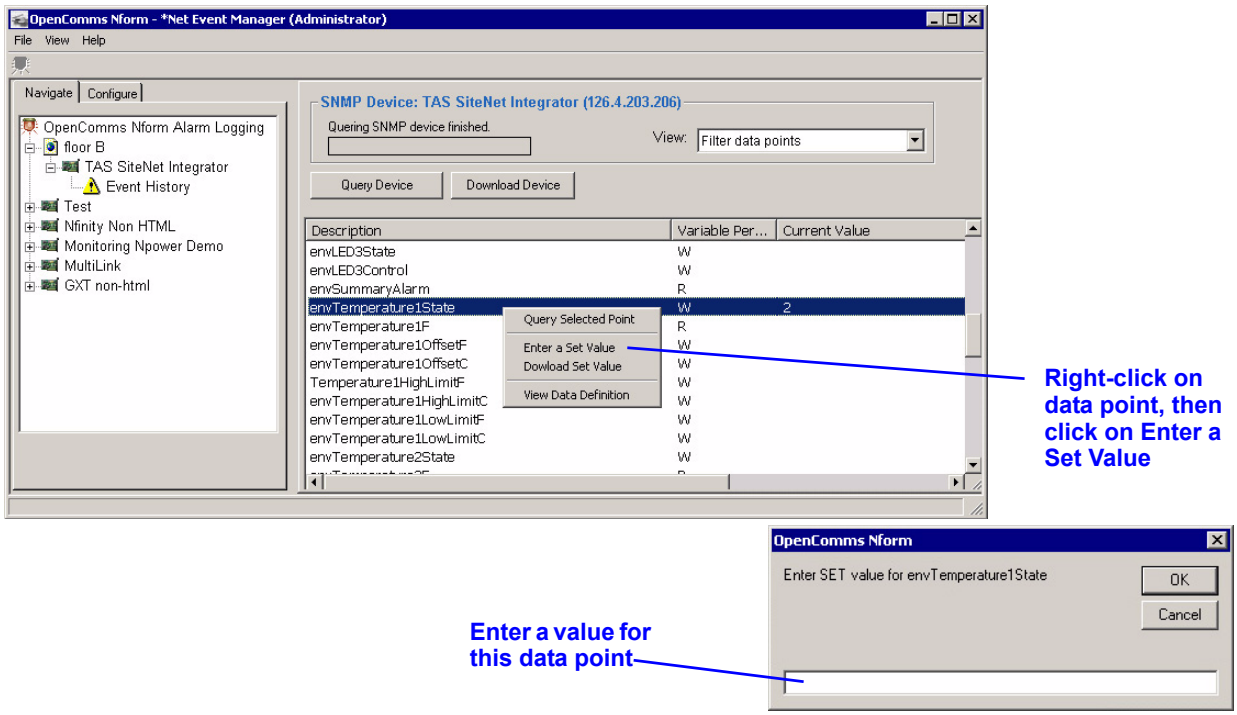
11.3.2 Set Values

Nform allows you to enter a set value for certain data points—only those with Write permission, noted by "W" in the Variable Permission column, as shown below. A set value determines when Nform performs a particular action, such as displaying an alarm for a device. As an example, you might want to enter a high-temperature value of 85°F as an alarm setpoint for a MiniMate2 unit. Actual values for any device will depend on your application. Set value variables can also be used for control and configuration functions, such as audible alarm control or temperature sensor state.

For help on the definition of a data point or its allowable values, see **11.3.4 - View Data Definition**.

To enter a set value:

- Log on as Administrator.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to change.
- In the right side of the window, right-click on a data point with Write access and choose **Enter a Set Value** from the pop-up menu.
- In the Enter Set Value box, enter the value and click **OK**.



- Repeat this for each data point for which you wish to enter a set value.
- Proceed to the next section, **11.3.3 - Download Device** to complete this process. Nform does not recognize a set value until the value has been downloaded to the device.

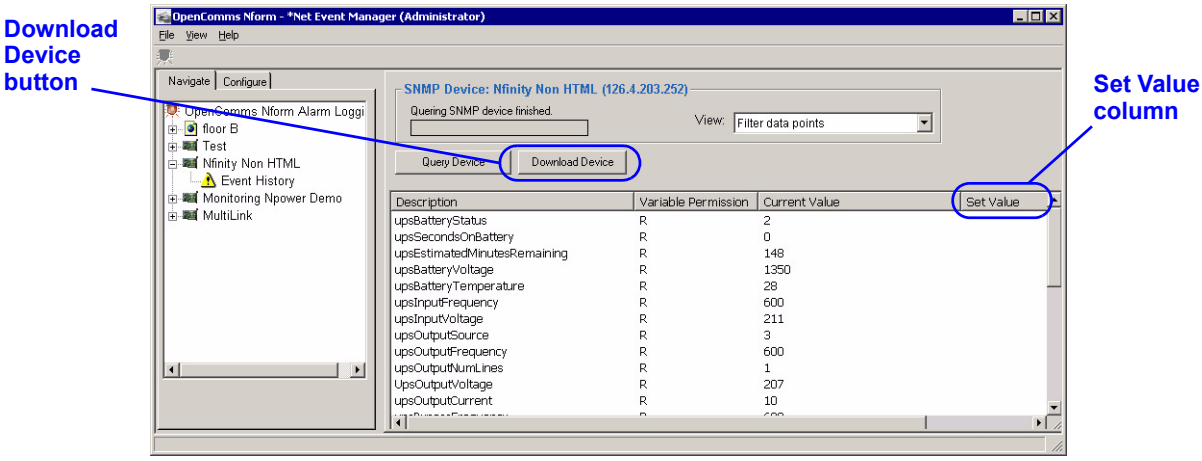
11.3.3 Download Device

After entering set values, as described in **11.3.2 - Set Values**, you must download them to the device before Nform can recognize them. You may download all set values at once or download an individual set value.

Download All Set Values at Once

To download all set values that have been entered for a device:

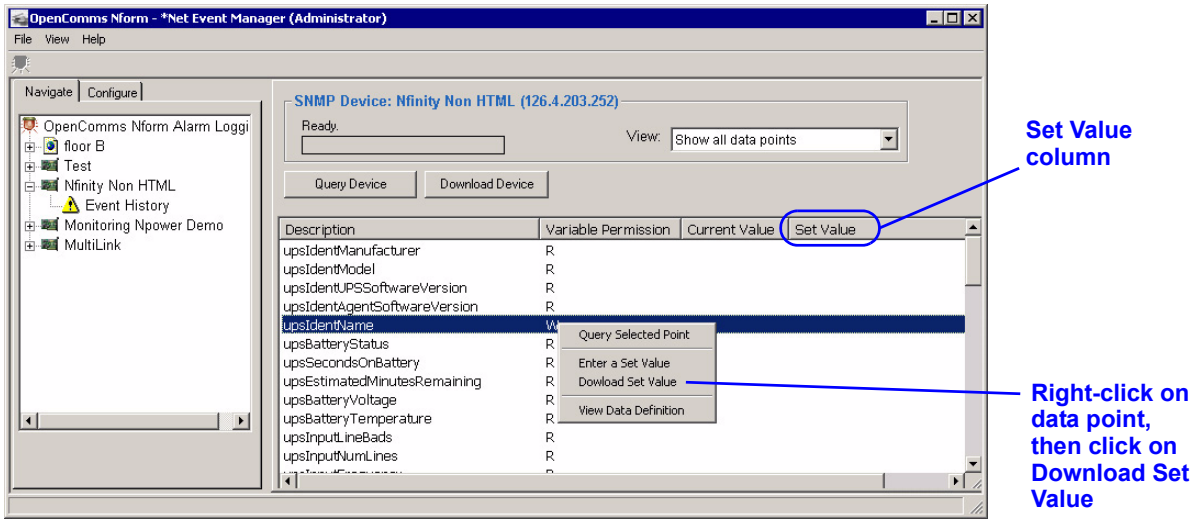
- Log on as Administrator.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to change.
- In the right side of the window, click on the **Download Device** button, as shown below. Once downloaded, the values appear in the Set Value column.



Download a Single Set Value

To download a set value for a single data point:

- Log on as Administrator.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to change.
- In the right side of the window, right-click on a data point and choose **Download Set Value** from the pop-up menu. Once downloaded, the value appears in the Set Value column.

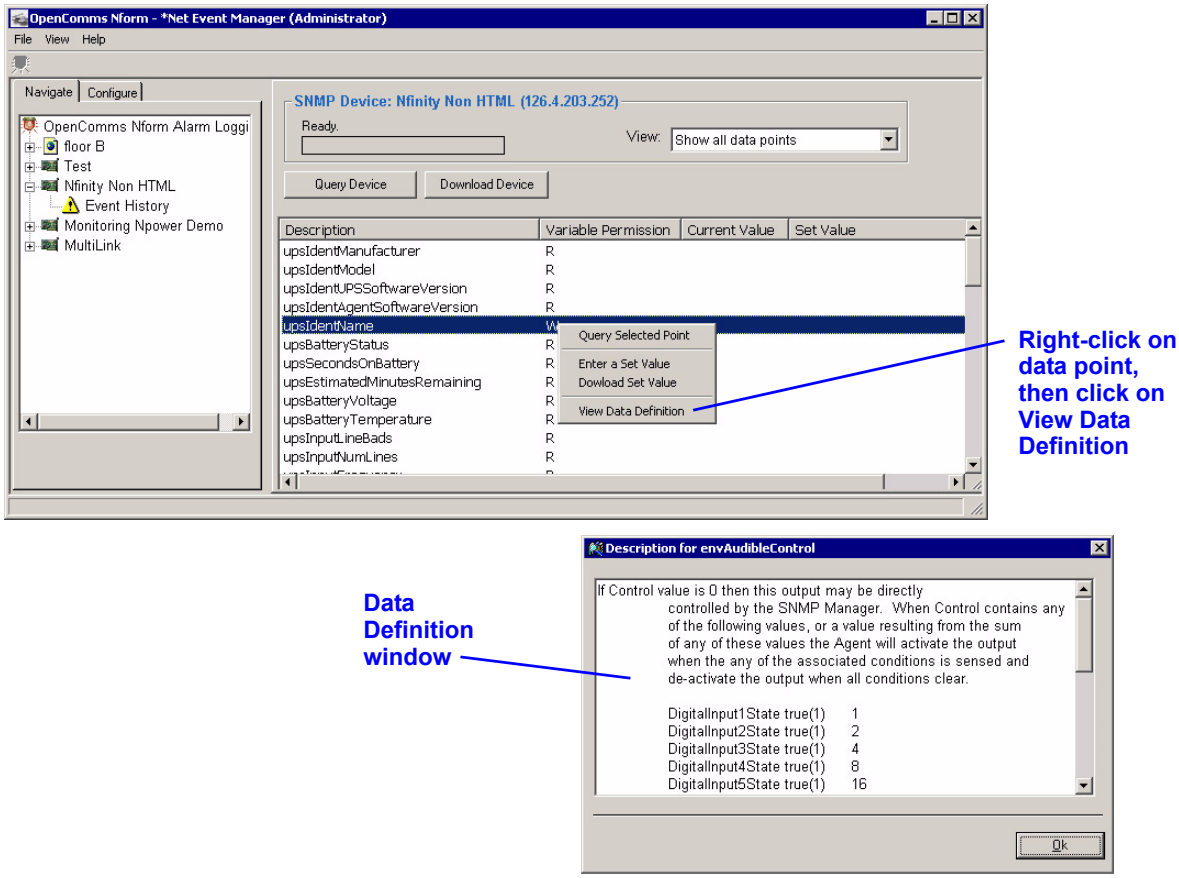


11.3.4 View Data Definition

To assist users in entering set values, Nform provides data definitions for some devices. Each definition provides a description of the data point and its valid values.

To view a data definition and allowable values:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- In the left side of the window, click on the device you wish to view.
- In the right side of the window, right-click on a data point and choose **View Data Definition** from the pop-up menu. Scroll through the information and click **OK** when finished.

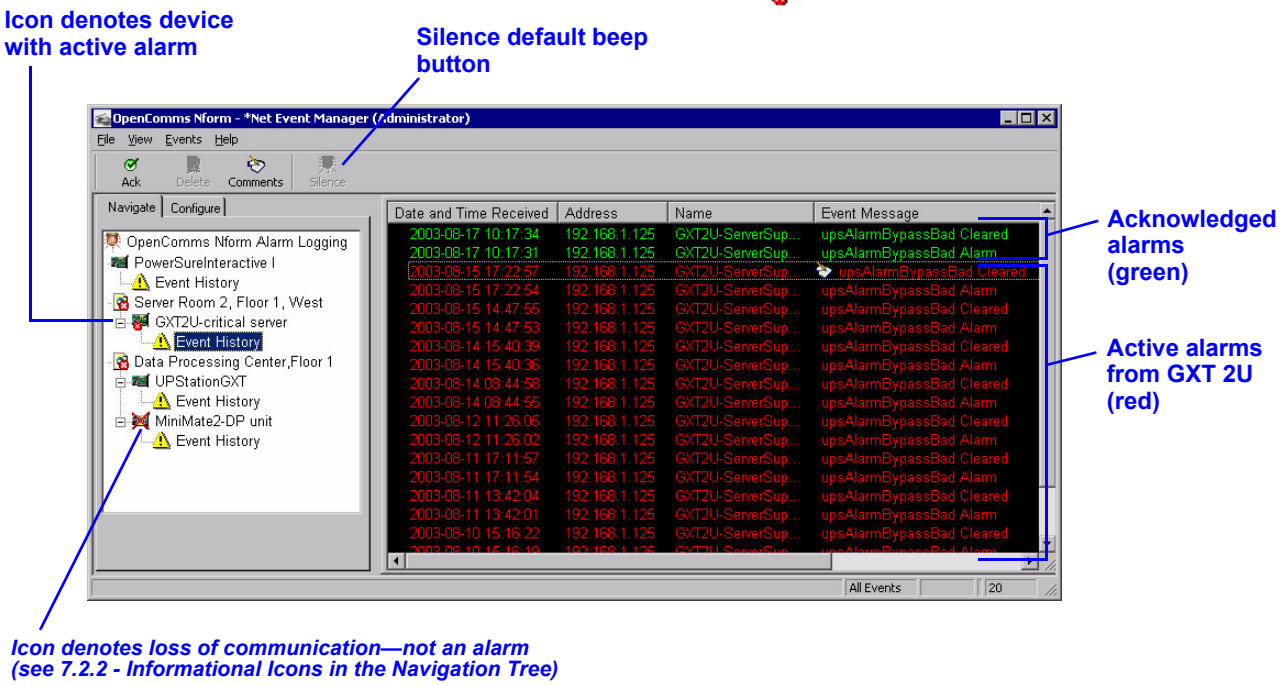

OpenComms Nform - *Net Event Manager (Administrator)
File View Help
Navigate Configure
OpenComms Nform Alarm Loggi
floor B
Test
Nfinity Non HTML
Event History
Monitoring Npower Demo
MultiLink
SNMP Device: Nfinity Non HTML (126.4.203.252)
Ready.
View: Show all data points
Query Device
Download Device
Description
Variable Permission
Current Value
Set Value
upsIdentManufacturer R
upsIdentModel R
upsIdentUPSSoftwareVersion R
upsIdentAgentSoftwareVersion R
upsIdentName
upsBatteryStatus R
upsSecondsOnBattery R
upsEstimatedMinutesRemaining R
upsBatteryVoltage R
upsBatteryTemperature R
upsInputLineBads R
upsInputNumLines R
Query Selected Point
Enter a Set Value
Dowload Set Value
View Data Definition
Right-click on data point, then click on View Data Definition
Data Definition window
Description for envAudibleControl
If Control value is 0 then this output may be directly controlled by the SNMP Manager. When Control contains any of the following values, or a value resulting from the sum of any of these values the Agent will activate the output when the any of the associated conditions is sensed and de-activate the output when all conditions clear.
DigitalInput1State true(1) 1
DigitalInput2State true(1) 2
DigitalInput3State true(1) 4
DigitalInput4State true(1) 8
DigitalInput5State true(1) 16
Ok

12.0 MANAGING ALARMS

This section describes how to view a listing of alarms, silence the default beep, change the status of alarms, add notes about an alarm, and change the colors that denote alarm status in the listing.

Nform assists in managing alarms by displaying their status, denoting each type with a different color of text. This enables the user, either the Administrator or Power User, to see at a glance whether a new alarm has been received and if action is required.

The example below shows a device with an active alarm and its event history on the right.


Icon denotes device with active alarm
Silence default beep button
OpenComms Nform - *Net Event Manager (Administrator)
File View Events Help
Ack Delete Comments Silence
Navigate Configure
OpenComms Nform Alarm Logging
PowerSureInteractive I
Event History
Server Room 2, Floor 1, West
GXT2U-critical server
Event History
Data Processing Center,Floor 1
UPStationGXT
Event History
MiniMate2-DP unit
Event History
Date and Time Received
Address
Name
Event Message
2003-08-17 10:17:34 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-17 10:17:31 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-15 17:22:57 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-15 17:22:54 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-15 14:47:55 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-15 14:47:53 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-14 15:40:39 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-14 15:40:36 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-14 08:44:58 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-14 08:44:55 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-12 11:26:05 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-12 11:26:02 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-11 17:11:57 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-11 17:11:54 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-11 13:42:04 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
2003-08-11 13:42:01 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Alarm
2003-08-10 15:16:22 192.168.1.125 GXT2U-ServerSup... upsAlarmBypassBad Cleared
All Events
20
Acknowledged alarms (green)
Active alarms from GXT 2U (red)
Icon denotes loss of communication—not an alarm
(see 7.2.2 - Informational Icons in the Navigation Tree)

Alarms can proceed through the following states: Active, Acknowledged and Deleted.

- When an alarm is received, it is **Active** (default text color: red).
- During or after instituting measures to resolve the alarm's underlying cause, the user may change the alarm's status to **Acknowledged** (default text color: green).
- The final alarm management step is to **Delete** the alarm, removing it from the list of alarms in the Net Event Manager. An alarm must be acknowledged before it can be deleted.

  In addition, deleting an alarm from the viewer permanently removes it from the alarm log file. The alarm log file (alarmlog.fil) is stored in the Nform directory in comma-delimited format for viewing in third-party applications.

Nform displays an alarm history, including current, active alarms and acknowledged alarms that have not been deleted, for each monitored, managed device in the Net Event Manager. New alarms are added at the top of the list. This history is displayed when:

- Nform is opened (before logging in)
- When OpenComms Nform Alarm Logging is selected in the **Navigate** tab
- When Event History is selected for any device in the **Navigate** tab

Alarms remain in this display until they are deleted, the final step in responding to alarms.

The user may add notes about any alarm in the Net Event Manager display. These notes remain only as long as the alarm is displayed in the Net Event Manager.

In addition to the Net Event Manager alarm listing, Nform records pertinent alarm data in an alarm log that Nform creates in its Data folder. This log is limited to 5,000 records by default. The number of records retained may be changed by the user (see **9.6.1 - Alarm Service**).

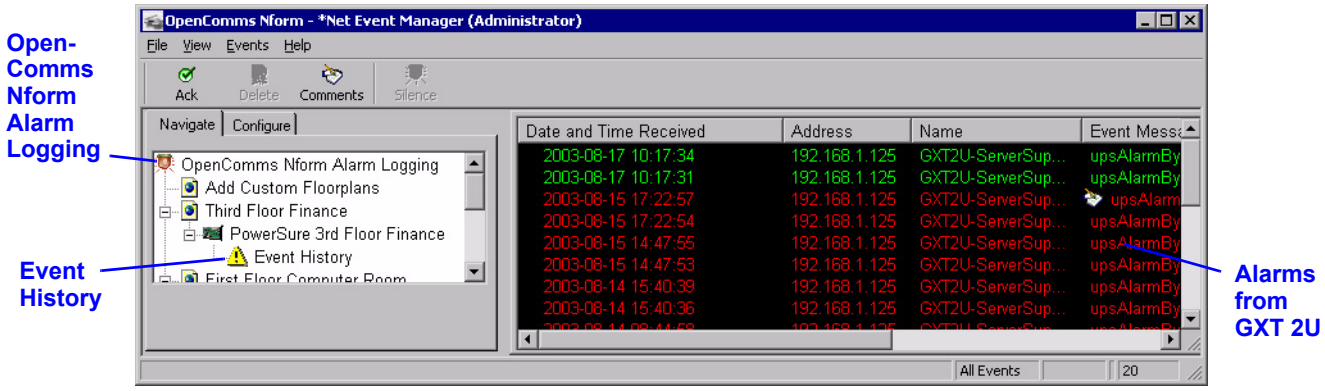
12.1 View Alarms

There are several ways to view alarms in the Net Event Manager.

- Alarms are displayed when Nform is started before you log on.
- Once you are logged on as either Administrator or Power User, there are two ways to view alarms:
  - Click on the **Navigate** tab, then select **OpenComms Nform Alarm Logging** at the top of the navigation tree (this reveals all alarms from all devices in the navigation tree).

    or
  - Click on the **Navigate** tab, then select **Event History** for any device in the navigation tree (this reveals only the alarms received from the associated device).

Alarms appear in the right side of the window, as shown in this example.

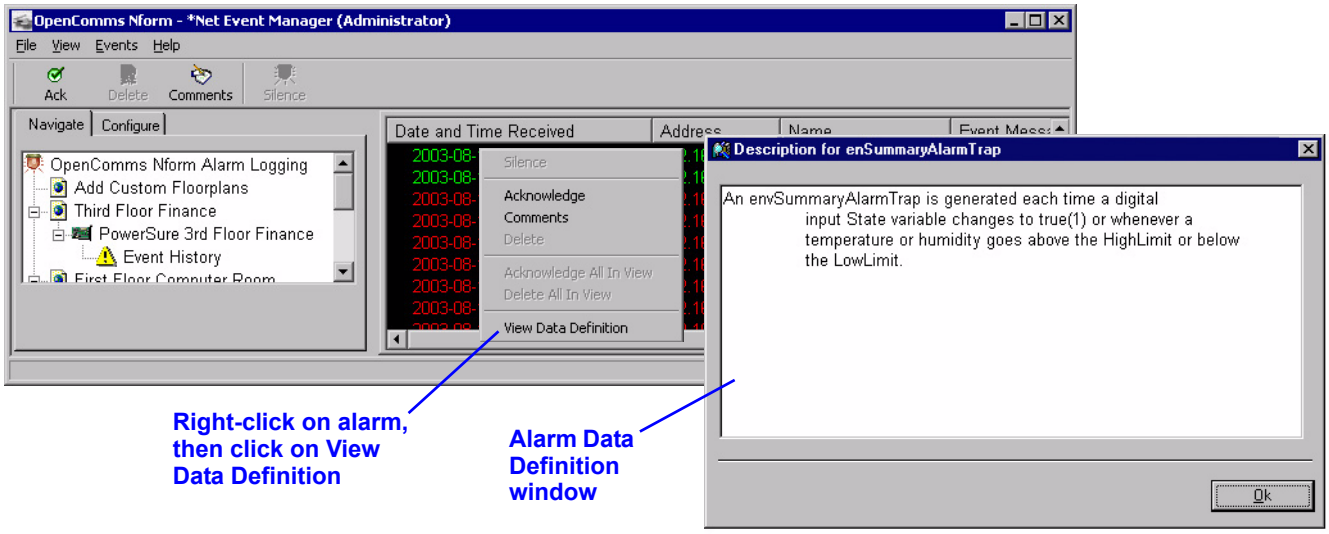


12.2 View Alarm Data Definition—SiteNet Integrator Only

To assist users in managing alarms, Nform provides data definitions for alarms on SiteNet Integrator. Each definition provides additional information about the alarm.

To view the data definition of an alarm:

- Log on as either Administrator or Power User.
- Click on Nform's **Navigate** tab.
- Select **OpenComms Nform Alarm Logging** at the top of the navigation tree (this reveals all alarms from all devices in the navigation tree).
- In the right side of the window, right-click on an alarm and choose **View Data Definition** from the pop-up menu. Scroll through the information and click **OK** when finished.


OpenComms Nform - *Net Event Manager (Administrator)
File View Events Help
Ack Delete Comments Silence
Navigate Configure
OpenComms Nform Alarm Logging
Add Custom Floorplans
Third Floor Finance
PowerSure 3rd Floor Finance
Event History
Date and Time Received
Silence
Acknowledge
Comments
Delete
Acknowledge All In View
Delete All In View
View Data Definition
Description for enSummaryAlarmTrap
An envSummaryAlarmTrap is generated each time a digital input State variable changes to true(1) or whenever a temperature or humidity goes above the HighLimit or below the LowLimit.
Ok
Right-click on alarm, then click on View Data Definition
Alarm Data Definition window

12.3 Silence the Default Beep

Nform can be configured to play a beeping sound—the default beep—in the monitoring computer when Nform receives an alarm from an SNMP device. This beep can be silenced through the Net Event Manager.

To silence the default beep:

- Log on as Administrator or as Power User.
- Click on the Events menu at the top of the window, and then click on **Silence**.
  or
- Click on the Silence button

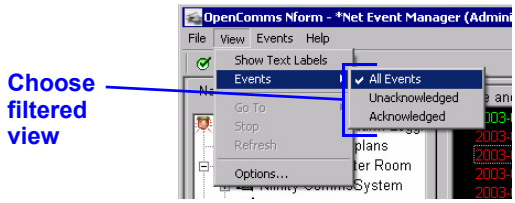
on the toolbar.

12.4 Filtering Alarms by Type

The Alarm Log in the Navigate tab displays all alarms by default but allows the user to filter alarms for management purposes.

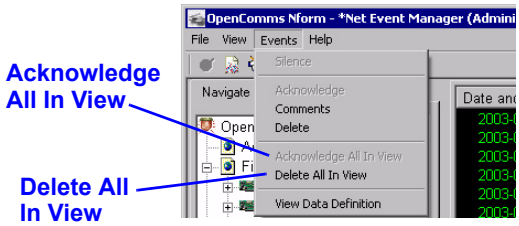
To filter alarms:

- Click on the View menu at the top of the window, then click on **Events**, and choose how to filter the alarms: All Events, Acknowledged or Unacknowledged.



After filtering the alarms, the user can perform batch functions as follows:

- Acknowledge all alarms in the filtered view by clicking on the Events menu at the top of the window, then on **Acknowledge All In View**.
- Delete all acknowledged alarms in the filtered view by clicking on the Events menu at the top of the window, then on **Delete All In View**. (Alarms must be acknowledged before they can be deleted.)

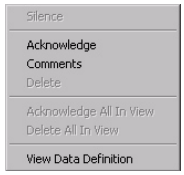


12.5 Change Alarm Status

Nform helps the user recognize new, active alarms through the alarm status feature, which displays alarm text in differing colors.

To change an alarm's status, log on as Administrator or as Power User. Then click on the **Navigate** tab and display the alarm listing as described in **12.1 - View Alarms**.

12.5.1 Acknowledge an Alarm



To acknowledge an alarm:

- Right-click on an alarm and click on **Acknowledge** on the pop-up menu, as shown at right. Two other ways to do this are:
  - Click on an alarm, then select **Acknowledge** from the Events menu.
    or
  - Click on an alarm, then click on the Acknowledge button

on the toolbar.

12.5.2 Delete an Alarm

An alarm must be acknowledged before it can be deleted. To delete an alarm:

- Right-click on an alarm and click on **Delete** on the pop-up menu, as shown at right. Two other ways to do this are:
  - Click on an alarm, then select **Delete** from the Events menu.
    or
  - Click on an alarm, then click on the **Delete** button

on the toolbar.

12.6 Add or View Alarm Comments

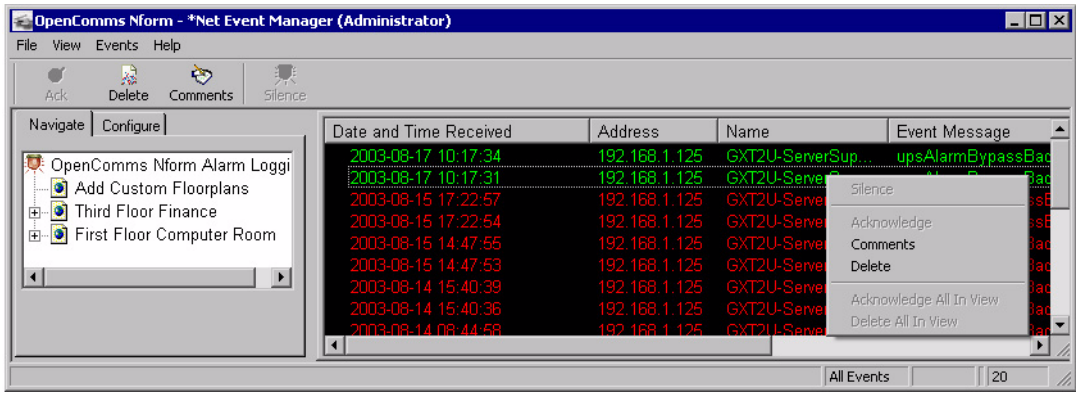
Nform allows you to add notes to any alarm in the alarm listing. The notes can be viewed and edited at a later time. The notes can perform several functions, including helping you keep track of actions taken to resolve an alarm condition and document the underlying cause of an alarm.

NOTE
Comments are not saved in the alarm log.

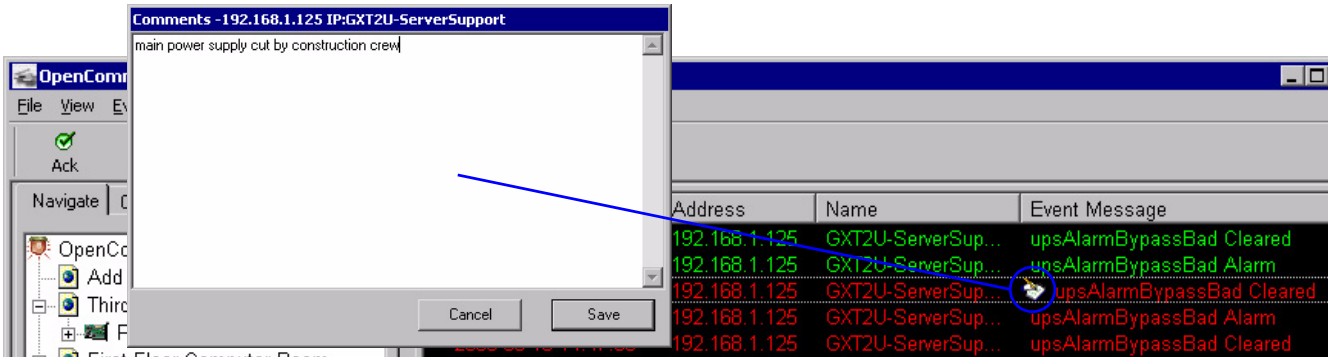
12.6.1 Add Comments to an Alarm

To add notes to an alarm:

- Right-click on an alarm and select **Comments** from the pop-up menu, as shown below. (Or click on the alarm, then select **Comments** from the Alarms menu or click the Comments button on the toolbar.)



- Enter notes in the Comments window, and click **Save**. Once a comment is added and saved, the Comments button icon will appear in the Event Message column for that alarm, as shown below.



12.6.2 View or Edit Comments

To view comments that have been added to an alarm:

- Right-click on an alarm and select **Comments** from the pop-up menu. (Or click on the alarm, then select **Comments** from the Alarms menu or click the Comments button on the toolbar.)
- In the Comments window, you may view or edit the notes and click **Save** or **Cancel** when finished.

12.6.3 Delete Comments

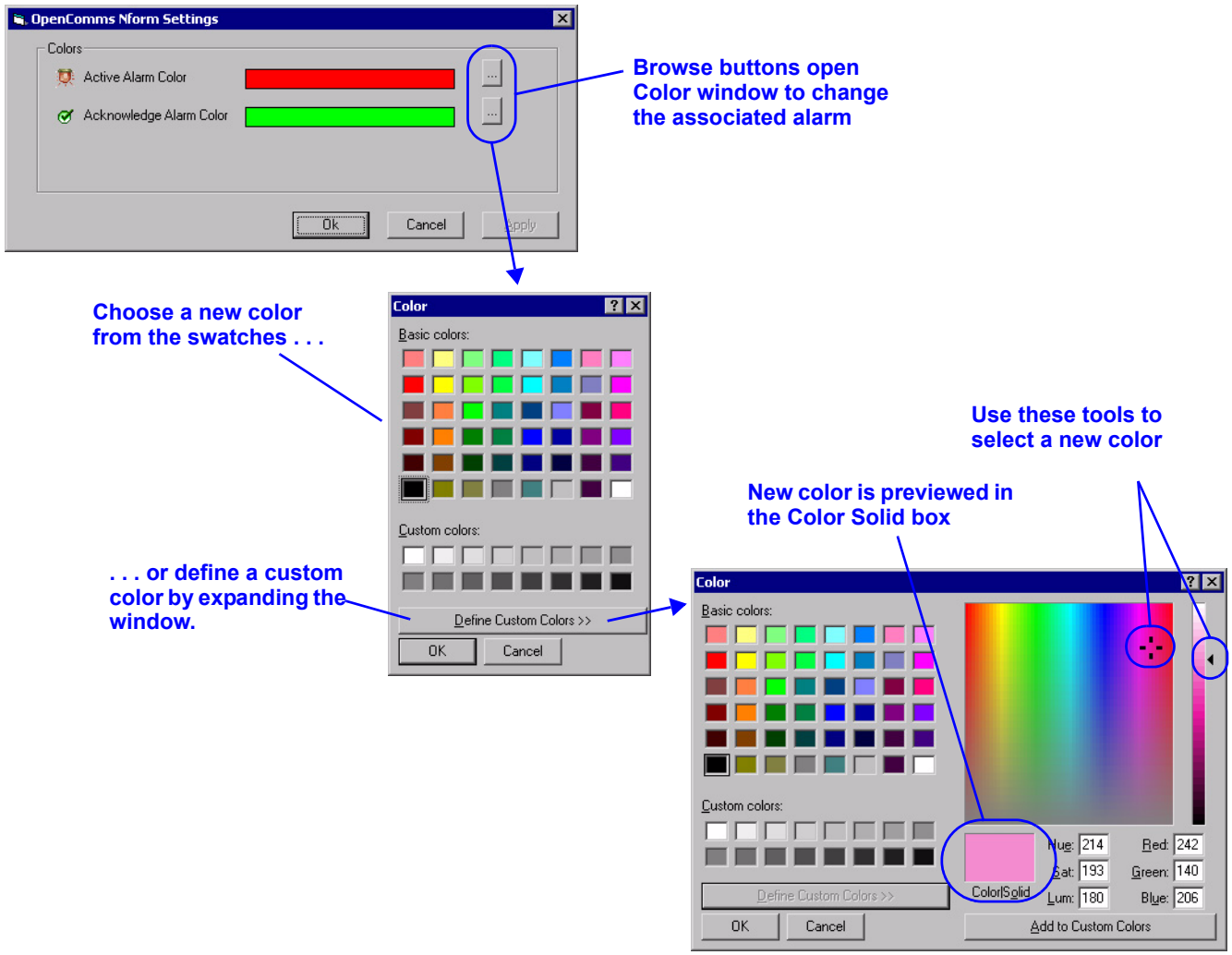
To delete comments without deleting the alarm:

- Right-click on an alarm and select **Comments** from the pop-up menu. (Or click on the alarm, then select **Comments** from the Alarms menu or click the Comments button on the toolbar.)
- Delete all the text and then click **Save**. This removes the comments from the alarm without deleting the alarm from the list.

12.7 Change Colors Indicating Alarm Status

You may change the default alarm status colors to suit your preferences. To do so:

- Log on as either Administrator or Power User.
- Click on the **Navigate** tab and select **Options** from the **View** menu. This opens the OpenComms Nform Settings window.
- Click the **Browse** button beside the alarm color to be changed.
- Choose a color from the swatches—or define a new color by expanding the **Color** window with the **Define Custom Colors** button and selecting a color using the slider tools or entering values in the boxes.
- Click **OK** in the Color window and the Settings window to save your changes or click **Cancel** to close the windows without saving.



13.0 RUNNING NFORM

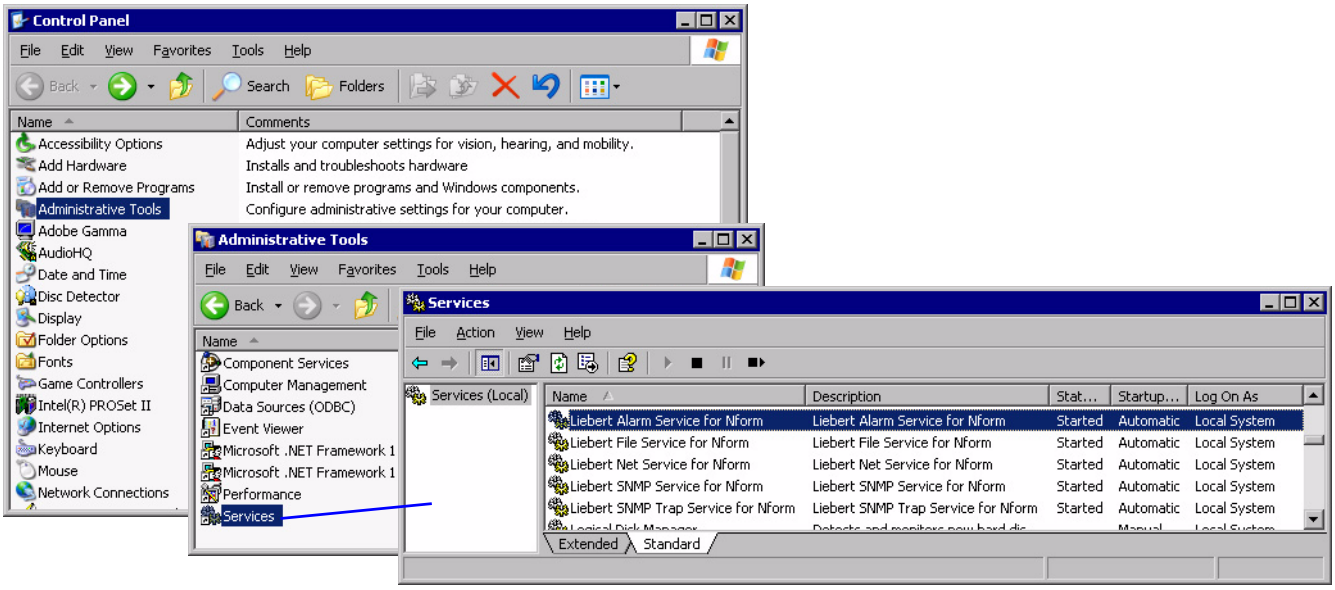
After installation, the Nform services begin running in the background, monitoring and managing all configured devices. Nform continues running constantly unless stopped through the Windows Services feature. The same option allows you to resume Nform services without having to restart the computer.

13.1 Starting or Stopping Nform Services

Under normal circumstances, you will not need to start or stop Nform services. Performing either operation requires opening the Services window, as described below. Stopping Nform means that the software is unable to monitor and manage your devices.

Opening the Services window

- Windows XP or Windows 2000: Click on the **Start** button, **Settings**, and then on **Control Panel**. In the Control Panel window, double-click on **Administrative Tools**, then double-click on **Services** to open the Services window.
- Windows NT 4.0: Click on **Start**, **Settings**, **Control Panel**, and finally **Services**.


Control Panel
File Edit View Favorites Tools Help
Back Search Folders
Name Comments
Accessibility Options Adjust your computer settings for vision, hearing, and mobility.
Add Hardware Installs and troubleshoots hardware
Add or Remove Programs Install or remove programs and Windows components.
Administrative Tools Configure administrative settings for your computer.
Adobe Gamma
AudioHQ
Date and Time
Disc Detector
Display
Folder Options
Fonts
Game Controllers
Intel(R) PROSet II
Internet Options
Keyboard
Mouse
Network Connections
Administrative Tools
File Edit View Favorites Tools Help
Back
Name
Component Services
Computer Management
Data Sources (ODBC)
Event Viewer
Microsoft .NET Framework 1
Microsoft .NET Framework 1
Performance
Services
Services
File Action View Help
Services (Local)
Name Description Stat... Startup... Log On As
Liebert Alarm Service for Nform Liebert Alarm Service for Nform Started Automatic Local System
Liebert File Service for Nform Liebert File Service for Nform Started Automatic Local System
Liebert Net Service for Nform Liebert Net Service for Nform Started Automatic Local System
Liebert SNMP Service for Nform Liebert SNMP Service for Nform Started Automatic Local System
Liebert SNMP Trap Service for Nform Liebert SNMP Trap Service for Nform Started Automatic Local System
Extended Standard

To verify that Nform is running:

The Services window shows whether the following Nform services are running:

- Liebert Alarm Service for Nform
- Liebert File Service for Nform
- Liebert Net Service for Nform
- Liebert SNMP Service for Nform
- Liebert SNMP Trap Service for Nform

To stop Nform—or any Nform service:

To stop Nform completely, you must stop all five services listed above by performing the following steps for each service.

- Select any service—for example, Liebert Alarm Service for Nform—in the Services window.
- Click on the **Action** menu at the top of the window, and then click on **Stop** to shut down the Nform service. Again, stopping Nform prevents the software from monitoring and managing your devices.

  Any service that has been stopped will resume functioning the next time the monitoring workstation is restarted.

To restart an Nform service immediately:

- Select the service—for example, Liebert Alarm Service for Nform—in the Services window.
- Click on the **Action** menu at the top of the window, then click on **Start** to restart the service.

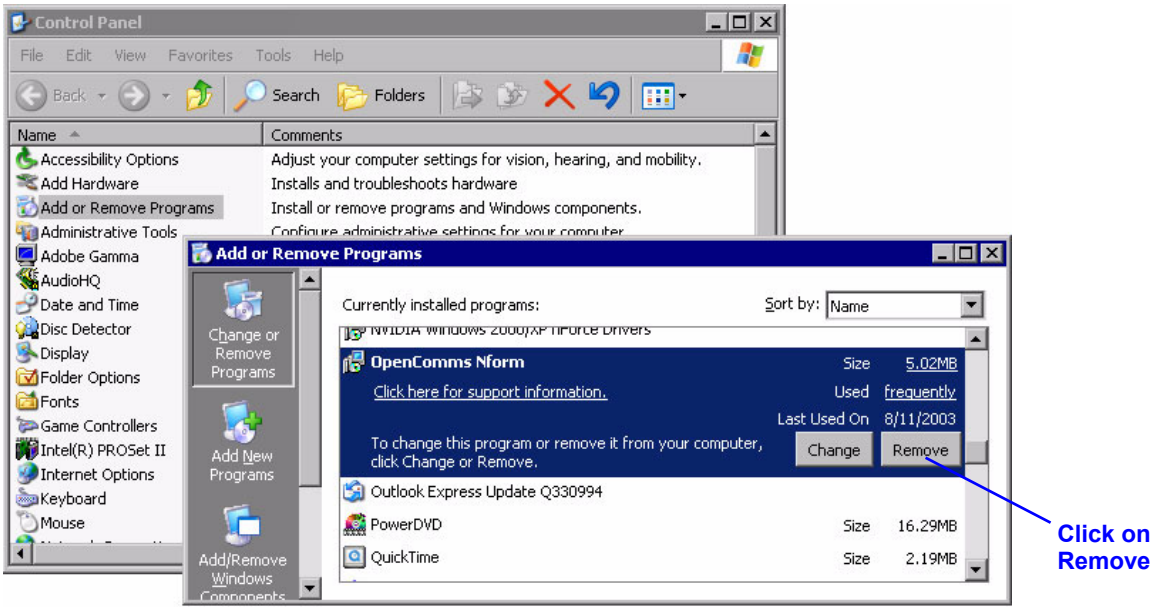
14.0 UNINSTALLING NFORM / REMOVING LICENSE KEYS

This section describes how to remove the Nform application and how to delete a secondary license key.

14.1 Uninstalling Nform

To remove Nform from your computer, run the Windows Add/Remove Programs control panel.

- Click on the **Start** button, then on **Settings**, and then on **Control Panel**.
- In the Control Panel window, double-click on **Add/Remove Programs**.
- In the list of Currently Installed Programs, highlight Nform and then click on **Remove**.



- A confirmation window asks whether you wish to proceed with the removal. Click **OK** to continue. This process removes the application files, but leaves the OpenComms Nform folder inside the Program Files folder, containing user-created files in the Data folder.
- Click **Close**.

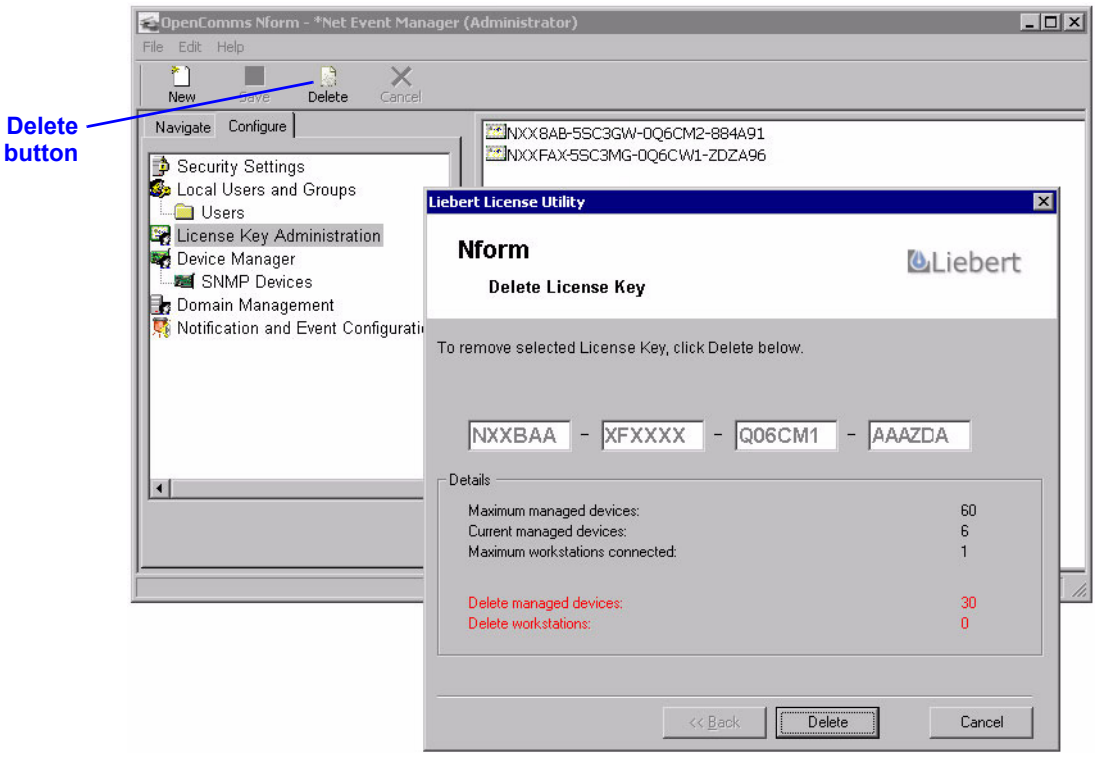
See **6.3 - Upgrading to a Newer Version of Nform** for instructions on upgrades.

14.2 Deleting License Keys

Your primary license key cannot be deleted, but you may wish to remove a secondary license key—for example, to move it to another computer to monitor a different group of devices. The primary license key appears first in the list in the right side of the window when **License Key Administration** is selected in the **Configure** tab.

To remove a secondary license key:

- Log on as Administrator.
- Click on the **Configure** tab.



- In the left side of the window, click on **License Key Administration**.
- In the right side of the window, highlight the license key you wish to delete.
- Click on the **Edit** menu at the top of the window, then click on **Delete**. (Instead, you may click on the **Delete** button on the toolbar.)
- This opens the Liebert License Utility window, showing the license key and the authorized number of managed devices to be deleted. To proceed, click on the **Delete** button.
- A confirmation window asks whether to continue with the deletion. Click **Yes** to proceed (or click on **No** to cancel without deleting the license key).

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OpenComms™ Nform Software License revision June 24, 2003

APPENDIX A - TECHNICAL INFORMATION & FREQUENTLY ASKED QUESTIONS

1. **What is a DHCP server?**

   DHCP is the acronym for Dynamic Host Configuration Protocol. This protocol allows hostnames to be allocated dynamically when computers are connected to a network. This protocol is often used to remotely grant a hostname to a computer for a limited time, as when a student uses a computer for a quarter or longer. See RFC-1541 for more detailed information. (RFCs are *Request For Comment* documents that set forth regulations on how communication occurs on the Internet. These documents are controlled by the Internet Engineering Task Force (IETF) and are available for viewing at the IETF Web site.)

2. **How do I identify possible TCP/IP port conflicts when using a UPS equipped with an SNMP card? How do I resolve the conflict?**

   TCP/IP port conflicts with port 162 can be resolved by stopping the SNMP trap service from running. This product does not support running on the same machine as a Network Management System (NMS).

   For the proper procedure to stop the SNMP services, see **13.0 - Running Nform**.

3. **What is a service?**

   A service is a process initiated at boot time that requires no user intervention to start and run. A service continues to run after the user logs off the computer.

APPENDIX B - DATA MONITORED BY NFORM

Liebert supplies a template for each SNMP device, containing data points and alarms applicable to that device. The names of data points and alarms can be changed (see **9.2.2 - Views tab**).

- **Data points** are the information Nform compiles from polling a managed SNMP device.
- **Alarms** are out-of-tolerance conditions that Nform reports to users.

Tables 5 and **6** below show sample data points and alarms for environmental and UPS units with SNMP cards. **Table 7** shows data points with sample values obtained from a UPS.

Table 5 Sample data points and alarms - Environmental unit

Data points	Alarms	
lgpEnvTemperatureSettingDegF	High Temperature	Manual Override
lgpEnvTemperatureToleranceDegF	Low Temperature	StandbyGlycoolPumpOn
lgpEnvTemperatureSettingDegC	High Humidity	Water Under Floor
lgpEnvTemperatureToleranceDegC	Low Humidity	Humidifier Problem
lgpEnvHumiditySettingRel	Loss of AirFlow	Low Water in Humidifier
lgpEnvHumidityToleranceRel	Change Filter	Smoke Detected
lgpEnvStateSystem	High Head Pressure 1	Low Water Flow
lgpEnvStateCooling	High Head Pressure 2	Loss of Power Alarm
lgpEnvStateHeating	Compressor OverLoad 1	General Fault
lgpEnvStateHumidifying	Compressor OverLoad 2	Local Alarm1
lgpEnvStateDehumidifying	Compressor Short Cycle	Local Alarm2
lgpEnvStateEconoCycle	Compressor Low Suction Pressure	Local Alarm3
Alarms Present	Main Fan OverLoad	Local Alarm4
		StandbyUnitOn

Table 6 Sample data points and alarms - UPS unit

Data points		Alarms
lcUpsIdentManufacturer	lcUpsOutputLoad	lcUpsOverloadWarningTrap
lcUpsIdentModel	lcUpsInverterStatus	lcUpsOverloadShutdownTrap
lcUpsIdentSoftwareVersion	lcUpsAlarms	lcUpsOnBatteryTrap
lcUpsIdentSpecific	lcUpsTestBatteryStatus	lcUpsLowBatteryWarningTrap
lcUpsIdentFirmwareVersion	lcUpsOnBypass	lcUpsLowBatteryShutdownTrap
lcUpsIdentSerialNumber	lcUpsBypassFrequency	lcUpsUtilPowerFailedTrap
lcUpsIdentManufacturerDate	lcUpsBypassNumLines	lcUpsUtilPowerRestoredTrap
lcUpsBatTimeRemaining	lcUpsConfigType	lcUpsInputOverVoltageTrap
lcUpsBatVoltage	lcUpsConfigBypassInstalled	lcUpsOverTempWarningTrap
lcUpsBatCapacity	lcUpsConfigModuleCount	lcUpsOverTempShutdownTrap
lcUpsInputFrequency	lcUpsConfigAudibleStatus	lcUpsAlarmTrap
lcUpsInputNumLines	lcUpsConfigLowBattTime	lcUpsOutputOffTrap
lcUpsOutputFrequency	lcUpsConfigAutoRestart	lcUpsOutputOffWarningTrap
		lcUpsOutputOnTrap
		lcUpsOutputOnWarningTrap
		lcUpsUnixShutdownTrap
		lcUpsUnixShutdownWarningTrap
		lcUpsInputFreqErrorTrap
		lcUpsOutputOverVoltageTrap

The information available for monitoring varies by type of unit being monitored—the type of UPS, cooling unit or other SNMP device. **Table 7** shows an example of monitoring data points with sample values obtained from a UPS with an SNMP card.

Table 7 Sample device information available for monitoring - Example for a UPS

Data point	Sample value
lcUpsIdentManufacturer	Liebert
lcUpsIdentModel	GXT700MT-120
lcUpsIdentSoftwareVersion	2.7.3
lcUpsIdentSpecific	1.3.6.1.4.1.476.1.1.1.14
lcUpsIdentFirmwareVersion	G_X.10.02
lcUpsIdentSerialNumber	0034200295AF1T1
lcUpsIdentManufacturerDate	07DEC00
lcUpsBatTimeRemaining	0129
lcUpsBatVoltage	27
lcUpsBatCapacity	100
lcUpsInputFrequency	60
lcUpsInputNumLines	1
lcUpsOutputFrequency	60
lcUpsOutputLoad	7
lcUpsInverterStatus	2
lcUpsAlarms	0
lcUpsTestBatteryStatus	2
lcUpsOnBypass (1-unknown, 2-yes, 3-no, 4-maint)	2-yes, 3-no, 4-(maint) _1.3.6.1.4.1.476.1.1.1.1.13.1.0,3
lcUpsBypassFrequency	60
lcUpsBypassNumLines	1
lcUpsConfigType	2
lcUpsConfigBypassInstalled	2
lcUpsConfigModuleCount	0
lcUpsConfigAudibleStatus	2
lcUpsConfigLowBattTime	2

APPENDIX C - ORDERING PARTS FROM LIEBERT

The table below lists part numbers for items available from Liebert Global Services.

To obtain any item, visit the Liebert Web site at **http://nform.liebert.com** or contact your local Liebert representative, value-added reseller, or distributor.

Table 8 Nform Part Numbers

Item	Part Number	Description
Nform Software on CD-ROM	NFORM	Nform Version 1.1
Additional Nform Licenses (up to 30 nodes)	NFORM-30N	Nform Version 1.1
Additional Nform Licenses (up to 500 nodes)	NFORM-500N	Nform Version 1.1

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MONITORING

OPENCOMMS™ NFORM

USER MANUAL

The Company Behind the Products

With over a million installations around the globe, Liebert is the world leader in computer protection systems. Since its founding in 1965, Liebert has developed a complete range of support and protection systems for sensitive electronics:

- Environmental systems—close-control air conditioning from 1 to 60 tons
- Power conditioning and UPS with power ranges from 300 VA to more than 1000 kVA
- Integrated systems that provide both environmental and power protection in a single, flexible package
- Monitoring and control—from systems of any size or location, on-site or remote
- Service and support through more than 100 service centers around the world and a 24/7 Customer Response Center

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SL-29000 (10/03)

Technical Support/Service

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www.liebert.com

Monitoring
800-222-5877
monitoring@liebert.com
Outside the US: 614-841-6755

Single-Phase UPS
800-222-5877
upstech@liebert.com
Outside the US: 614-841-6755

Three-Phase UPS
800-543-2378
powertech@liebert.com

Environmental Systems
800-543-2778

Outside the United States
614-888-0246

Locations

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